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The materials for this study were collected under the auspices of the Child Study Committee of the International Kindergarten Union, of which the writer was chairman for the three years 1919 - 1922. The general subject of the Committee have varied from time to time as presented, in the assembling of the drawings and in the judgments incident to the construction of the scales. While an extensive study could not have been possible without their reports, their material was not as direct from the individual initiative and constructive ideas of the children. The investigation was a study of the drawings of the children of the Department of Psychology of Johns Hopkins University. The methods of investigation, the construction of material and data, and the interpretation are here.

# CHILDREN'S DRAWINGS,

## A STUDY OF INTERESTS AND ABILITIES.

### DISSERTATION

Submitted to the Board of University Studies of the Johns Hopkins University, in conformity with the requirements for the degree of Doctor of Philosophy,

Agnes Mace, Instructor in Kindergarten Education,  
Teachers' College, Columbia University,  
Dr. William A. Derman, State University, Rochester,  
N.Y.

Edna A. Derman, Instructor in School of Elementary and  
Secondary Education, Illinois, Ill.

Stella Agnes McCarty  
Mary E. Mace, State University, Chicago, Ill.  
Ada J. Mace, Public Schools, Detroit, Michigan.  
Alice V. Mace, Supervisor of Kindergartens,  
Cambridge, Mass.

Robert E. Mace, Supervisor of Primary Grades,  
Berkeley, Cal.

Marion Mace, School Director of Catholic Kindergartens,  
State of Pennsylvania.

Miss Mace, Instructor, State Normal School,  
Mankato, Minn.

Dr. John A. Mace, (now) Professor of Psychology,  
Johns Hopkins University.  
Stella A. Mace, Chairman.

Baltimore, Maryland.  
May 1, 1923.





It was the desire of the Committee to make an original contribution in the field of child study, by the intensive investigation of some one form of spontaneous expression by young children. For several reasons drawing was finally selected for this purpose. It is one of the most universal and typical modes of child activity, both in the school and the home. Its materials are easily collected and subjected to investigation and analysis. It yields results which give promise of definite interest in their bearing on some of the unanswered questions of child psychology. Some of these questions had been definitely stated and passed on to us as suggestions by the previous Committee on Child Study.

Since the interest of the investigation was primarily in the period of childhood, the study was arbitrarily limited to the period of the Kindergarten, first and second grades. This period formed a convenient and seemingly valid unit - in view of the increasing tendency of psychologists to regard the ages represented in these grades as comprising a somewhat closely related stage of child development, having many psychological traits in common; and the equally significant practical tendency to regard these grades as one unit for purposes of school organization and supervision.

However, the well known effect of school retardation is to hold many children in the Kindergarten and more especially in the first and second grades, far beyond the normal period, so that these grades have the widest distribution of ages to be found in the whole school system. But the chronologically older children are not typical of these grades. Either they are accidentally retarded, normal children who by rights belong in higher grades or, more frequently, subnormal, actually accelerated children, who belong in a segregated class from the beginning.

In order that the study might be freed from the complications presented by these two groups, arbitrary age limits were fixed at four years, and eight years 11 months. Considerable data were secured on the overage groups, but they have been rightly excluded from the main study, being treated separately in so far as it has been possible to use them at all. The investigation was defined as a study of the spontaneous drawings of children of the Kindergarten, first and second grades, and of the ages from four to eight inclusive.

Further limitations of purpose were necessary however, and after careful consideration, it was decided that an examination of the subjects drawn, as possible evidence of children's trend of interests, was the fundamental problem, the results of which would determine somewhat the direction of further research. The construction of a series of scales for the measurement of abilities seemed the logical next step. The application of the scales to the drawings





available, for the determination of age norms. Relative abilities of age - grades and sexes, and correlations with general intelligence naturally followed. And, finally, certain subsidiary questions as to the trend of development in drawing technique - in the use of outline and mass, full-face and profile representation of the human form, proportion, balance, and perspective - presented themselves as of minor interest; at least to those practically concerned with primary education. The study proceeded in virtually this order.

The first task, however, was the collection of a sufficient mass of material - a large number of drawings, made by children of the desired ages and grades, as spontaneous as could possibly be secured under school room conditions, and from as wide a geographical range as possible. Letters were sent to 34 cities, asking the cooperation of public school superintendents or supervisors in securing this material. The cities were so selected as to represent North, South, East and West, Central and Rocky Mountain areas, metropolises and smaller towns, the one uniform condition being that there should be kindergartens connected with the schools. Some private schools were also included.

Twenty six cities responded favorably - Anderson, Indiana; Baltimore, Maryland; Boise, Idaho; Berkeley, California; Boston, Suffolk, Massachusetts; Chicago, Cincinnati, Cleveland, Denver, Des Moines, Detroit, Grand Rapids, Indianapolis, Kansas City, Mo.; Los Angeles; Milwaukee, New Orleans, New York; Pittsburg; Richmond, Ind.; Richmond, Va.; Rochester, N.Y.; St. Louis, Trenton and Washington, D.C.

At once, type written directions were sent to each city in sufficient number for every teacher who was to participate. It was suggested that the schools be selected with regard to social conditions, so that all classes should be represented; and that the distribution of drawings from the three grades be equalized as far as possible. The instructions were as follows :

We are desirous of making some very definite investigations with regard to children's drawings. As the first step we wish to know what subjects children of the ages from four to eight years inclusive choose for their spontaneous drawings,

Will you assist us by carrying out the following instructions:

(1). Give to each child, or have him procure for himself, wax crayon in brown or black, and drawing paper 6 x 9 inches.

(2). Say, " I want you each to make me a picture to-day. You may draw anything you wish. Don't let anyone know what you are going to make. When you have finished, bring it to me, and see if I can tell what it is. Draw anything you want to." Give no further suggestion, or guidance, or criticism - except to repeat if necessary the above directions.

(3). Write on the back of each drawing the sex, age of the child in years and months, and the name of the object - or objects represented.



The response was gratifying. In most instances, the returns were sent from the third grades. In a few instances this was not possible, and in one city, where a complete representation was not practicable, but where there is an unusually large enrollment of four year old children in the kindergartens, only the four year old children were included. Since the age of admission to kindergarten in many cities is five years, the representation of four year old children is relatively small. Many eight year old pupils have passed beyond the second grade. For this reason, and also because, owing to a misunderstanding of the directions, some eight year drawings were discarded before the results were forwarded to the committee; the representation of eight year children is also smaller. Nevertheless, the returns for all grades and years are sufficiently large to have scientific significance.

All drawings not clearly designated as to sex and age were discarded. Those for which the grade was not indicated are listed as unclassified. The returns were as follows:

TABLE I.

|              | Kindergarten | First Grade | Second Grade | Ungraded | Total | Grand Total. |
|--------------|--------------|-------------|--------------|----------|-------|--------------|
| 4 Yrs. Boys  | 1102         | 4           |              |          | 1106  |              |
| Girls        | 1366         |             |              |          | 1366  | 2549         |
| 5 Yrs. Boys  | 3816         | 146         | 2            | 133      | 4096  |              |
| Girls        | 4078         | 129         |              | 96       | 4303  | 8599         |
| 6 Yrs. Boys  | 1211         | 3193        | 151          | 362      | 4917  |              |
| Girls        | 1076         | 3369        | 169          | 420      | 5034  | 9951         |
| 7 Yrs. Boys  | 78           | 1766        | 1799         | 318      | 3861  |              |
| Girls        | 77           | 1704        | 2070         | 373      | 4224  | 8085         |
| 8 Yrs. Boys  | 1            | 279         | 668          | 160      | 1108  |              |
| Girls        | 3            | 241         | 645          | 163      | 1052  | 2160         |
| Totals       |              |             |              |          |       |              |
| Boys         | 5278         | 3308        | 2664         | 1613     | 12863 |              |
| Girls        | 5872         | 5438        | 2884         | 1097     | 15291 |              |
| Boys & Girls | 12251        | 10800       | 5548         | 2710     | 31259 | 31259        |

Two restrictions were imposed upon the liberty of the children - those of size of paper and color. The first seemed imperative for practical reasons, though the Committee was fully conscious of the present tendency toward very large materials, with its psychological and hygienic significance. However, in handling the large mass of material required for the study, it was thought that even 9 x 12 inch paper would prove prohibitively unwieldy.

Color was eliminated deliberately for the purpose of simplifying the problem of evaluating the drawings and constructing the scales. The Committee wished to limit its aim to the consideration of one type of ability - the ability to express meaning through line and mass. It was assumed that ability to handle color may very probably be a specialized trait, not necessarily associated with power of representation in form. The attempt to consider the two together therefore would complicate the situation enormously. A fine use of color may conceal easy gradation of form, and, on the other hand, faulty coloring may detract from representation otherwise good. The difficulty of evaluating





form, as distinct from color, is heavily increased at least ten fold. It seemed advisable therefore to eliminate color from the present investigation, though with a keen realization that it plays an important part in the educational use of drawing, and that its investigation offers an alluring field for future study.

Undoubtedly for some children who have been accustomed to the free use of color and to paper of large size, these two restrictions were distinctly limiting factors in expression. Never the less, the results seem to justify the procedure. The wide range of subjects represented is not suggestive of wide spread restraint in self-expression. The excellence of many of the drawings is a sufficient denial of the deterrent effect of either limitation. The fact that young children frequently choose deliberately some one color, or paper of small size, suggests that the two are not contrary to normal tendencies.

Finally, there is some definite confirmation of these assumptions. A number of teachers, not content with following directions, sent two sets of drawings - one made under the specified conditions, the other on larger paper, with unrestricted color. Their avowed purpose was to prove that the children's powers had been hampered by the restrictions. In fact, when the pairs of drawings were evaluated by trained judges, strictly on the basis of their representative value in form, there was no appreciable difference. Whether this would be true of large numbers of drawings remains to be seen. The statement is not to be understood as suggesting the advocacy of the habitual elimination of color, or the use of hygienically questionable dimensions. The procedure was thought justifiable for the purposes of scientific experiment - not for educational practice.

Each drawing had been labeled by the teacher with the age and sex of the young artist, and the subject, or subjects, represented. On receipt of the packages at headquarters, every set was stamped with two symbols, one for the grade and one for the city, so that it was possible to arrange and classify the drawings in any desired way without destroying the identity of any sample.

The first problem for investigation was the range of subjects selected by the children. A number of previous investigators have been interested in this question. Shinn, Major, Brown, Rogers and Jordan have collected drawings of individuals or small groups of children, extending over a period of years, and indicating changes of interest with age. These studies cover in general the period from one to three, four or five years, and are especially valuable for the light they throw upon the development of power in representation. Several others have made mass studies of considerable numbers of children.

Lukens (1927) collected 1232 drawings of children under ten years of age. He found that 44 % of all children represented the human form, or, if illustrations were included, 75 %. Twelve percent illustrated stories, seven percent trees animals, three percent plants, two percent geometrical forms, design and scribble combined.





Mrs. Wallis (reported by Lucas, 1937) collected 1674 drawings of children ranging in age from five to seventeen years, from the public schools of California and the Experimental School of Harvard University. Of these forty-five percent of the younger children had drawn the human figure, forty percent still life, thirty-five percent plants and flowers, thirty-two percent houses, five percent design and three percent ornament. The drawings of children from eight to ten years of age remained substantially the same in content as those of the younger children.

Katzeroff (reported by Ivanoff, 1940) examined 2032 drawings of children from the public schools of Geneva, Switzerland, to discover the range of interests. He found again that the human form predominated, and of the persons drawn, ninety-five percent were adults. He also indicates certain sex differences. The boys drew a wider range of subjects, while the girls tended to draw objects from their immediate environment. The girls also drew more landscapes, flowers and geometrical forms than the boys, suggesting a more limited mental content, or a more docile attitude toward school instruction. None of these studies states the conditions under which the samples were obtained.

However, since none of these studies covers definitely and specifically the period of the present investigation, and since the most recent of them was reported thirteen years ago, it seemed worth while to attack the problem anew. Each one of the 31239 drawings was therefore examined, and, with the aid of the interpretation written on the back, was recorded, each separate idea being noted and also, in case of compositions, the subject of the composition. The only omissions were the ground, smoke from the chimney, and repeated objects. If two or more children, or trees, or houses, were drawn in a single picture, only one was recorded. Ground and smoke were omitted as non-essential. From the vantage point of present experience, this is perhaps unfortunate.

In the early stages of the work the teachers giving the test were requested to make the record, using a standard form. Later, it was found best to spare the teachers, and, incidentally to secure uniformity of method by having all tabulations made by a clerical force under the supervision of the chairman. The records made by the teachers were afterward revised by this same clerical force, and thus made comparable with the other results.

The work of each class was first recorded on a separate sheet, next, all the returns for each grade were combined into a tabulation for the city. These tables were then summarized into a graded table for all cities. Finally, the results of the three grades were combined into a general summary by ages and sexes. At each stage of the process, the specific character of the data was









presented in all its detail, as but it is not possible to refer here to any extent, to analysis and compare by sex, age, grade, or city. A sample of a class record is given in Table II. The complete list by years and doses is presented in Table III (omitted).

The first impression is one of astonishment at the variety and range of subjects attempted. Nothing seems to be beyond the efforts of the child artist - whether in the heaven above, or the earth beneath, or the waters under the earth. About nine hundred different ideas are represented in all, including -

|                                                  |            |
|--------------------------------------------------|------------|
| Human beings of diverse character -              | 72         |
| Domestic animals -                               | 18         |
| Wild animals -                                   | 31         |
| Domestic Birds                                   | 8          |
| Wild Birds                                       | 18         |
| Insects -                                        | 18         |
| Trees -                                          | 8          |
| Flowers                                          | 32         |
| Fruits                                           | 18         |
| Vegetables                                       | 19         |
| Sky, clouds and related ideas -                  | 18         |
| Rivers, mountains and other geographical ideas - | 28         |
| Miscellaneous forms from nature -                | 32         |
| Houses and parts of houses -                     | 13         |
| Public Buildings                                 | 30         |
| Animal Houses                                    | 10         |
| Miscellaneous Buildings                          | 39         |
| Vehicles -                                       | 44         |
| Tools                                            | 134        |
| Receptacles -                                    | 24         |
| Toys -                                           | 69         |
| House Furnishings -                              | 70         |
| Dishes                                           | 28         |
| Food -                                           | 23         |
| Clothing -                                       | 37         |
| Anatomical ideas -                               | 14         |
| Miscellaneous ideas -                            | 102        |
|                                                  | <hr/> 1028 |

The data in this detailed form are too complex to suggest any general tendencies, or to lend themselves to analysis and comparison. It was necessary to classify the materials, reducing them to a few generic groups. After considerable study of the material, it was finally reduced to twenty-nine headings, exclusive of compositions, which were reserved for separate treatment. The classifications in some instances may seem arbitrary. All ideas which recurred with sufficient frequency - or which promised data of special interest - were placed in separate classes; as, trees, flowers, insects, flags, design. In many instances, related ideas were grouped together - as animals, public buildings. Finally numerous forms, not lending themselves





to any more local grouping, were listed together as miscellaneous nature forms, miscellaneous buildings, or miscellaneous - "Neither fish, fowl, nor good red herring".

Most of the headings are self-explanatory. By referring to Table III the method of organization may be clearly seen. No object is listed separately which is essentially a part of a larger world. Hair, eyes, nose, hands, stove, and chimney are all inventoried because they were drawn as separate units, distinct from the human form or the house in which they normally occur.

Human beings are classed as either adults or children and babies. In case a definite character has been portrayed - either from history or literature, or present day life, it has been listed as "special character". Animal is used in its wider generic meaning to embrace all forms of animal life, except that birds and insects have been reserved for separate groups.

Sky, clouds, etc., includes rain, snow, water (except in streams or larger bodies) and Aurora Borealis. Geographical conceptions covers rivers, lakes, seas, hills, mountains, and also roads and streets. Miscellaneous nature forms includes all natural objects not otherwise listed; as, bird nests, spider webs, and stones. Houses includes only dwelling houses. Public buildings covers hospitals, churches, jails, factories and shops. Animal houses means the houses of animals - dog kennels, wild animal cages, rabbit hutches, or barns. Furniture covers all forms of house furnishings, except those otherwise listed. Under vehicles are classed virtually all mechanical means of locomotion; for example, wagons, automobiles, trucks, sleighs, doll buggies, aeroplanes, and boats.

Tools embrace all types of personal and household utensils, farm implements, weapons, and machinery. Receptacles are defined as containers of every sort - barrels, boxes, trunks, garbage cans, and pocket books. Under toys are listed all materials for games and all apparatus for sports and play; as, see-saws, golf clubs and skis. Clothing includes articles of personal use and adornment, as well as covering - eyeglasses, bracelets, and shoes. By the classification of fruits and vegetables under separate headings foods were limited chiefly to manufactured products.

Letters and numbers were listed in order to indicate the interest of children in printing or writing for its own sake. They do not include the narrative writing of the name on the back of the paper to designate ownership (found almost exclusively in the second grade) but the numerous attempts to write or print words or letters or numbers, either in relation to a picture, or, more frequently, as isolated objects of interest - attempts which were found at four years, and more often at five or six years, possibly as hints of a dawning interest in symbols.

The complete data as classified in this manner are given in Table IV. Since the number of drawings varies considerably for the several grades and ages, and, to a less degree, for the boys and girls, these



**FOLD OUT**





Facts are not comparable until they have been reduced to a common basis. The basis selected was the ratio of each class to the total number of objects drawn. Table V. gives the summary on which these percentages have been calculated. It reads, the four year old boys in kindergarten drew a total of 2242 objects, these in first grade, 11, making a total of 2253 objects drawn by four year old children, etc.

TABLE V.

|               | Kindergarten | First Grade  | Second Grade | Unclassified | Totals       | Grand Totals |
|---------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 4 Yr. Boys    | 2242         | 1            |              |              | 2243         |              |
| Girls         | 2565         | 0            |              |              | 2565         | 4767         |
| 5 Yr. Boys    | 2009         | 511          | 16           | 193          | 2729         |              |
| Girls         | 2703         | 452          | 21           | 159          | 3295         | 16239        |
| 6 Yr. Boys    | 2841         | 8109         | 409          | 470          | 11639        |              |
| Girls         | 2570         | 3911         | 522          | 535          | 12538        | 24198        |
| 7 Yr. Boys    | 155          | 4880         | 4571         | 715          | 10671        |              |
| Girls         | 130          | 4225         | 5709         | 596          | 11740        | 22329        |
| 8 Yr. Boys    | 0            | 747          | 1371         | 413          | 2531         |              |
| Girls         | 0            | 227          | 1375         | 445          | 2047         | 4574         |
| <b>Totals</b> | <b>27475</b> | <b>33323</b> | <b>15041</b> | <b>3905</b>  | <b>76644</b> | <b>76644</b> |

Total number of objects drawn.

Table VI gives the percentages for the several classes of objects; by grades, age and sex. (Note: Table VI is inserted on separate sheet.) Several comparisons are at once possible. Beginning first the grand totals, in which are combined the figures for the five years, for all grades, and for both sexes, we may discover certain generic trends of interest. It is evident that the human figure is most popular, comprising 16.3% of all the objects drawn. The adult form is slightly more popular than the child. Houses come second, with 13.2%. These two are in harmony with previous studies, though the different basis of computation of this table makes it impossible to compare definitely. Trees (9.3%) and Furniture (8.5%) were less expected. The low status of animals (4.0%) and of toys (3.2%) which are on the same level with flowers, was even less to be anticipated. The meager showing of design (1.5%), in view of the past emphasis which the Kindergarten has placed on it, is significant. These facts are presented graphically in Figure 3, which needs no explanation.

Crossing the facts still further, we find that interest in nature claims 30.4% of the drawings, while interest in man and the activities, tools and buildings connected with social life may be fairly said to claim all the rest - excepting only the .3% that represents the survival of the scribble stage, and possibly the .5% that represents design; also the .1% of geometrical forms, which is probably the survival of an earlier age of Kindergarten training, since it was limited to one or two titles, and exclusively to the Kindergarten group. It seems fair to say that while nature is all the aspects holds the first of the representative interest of these children, human life and its relationships monopolizes the remaining two thirds.

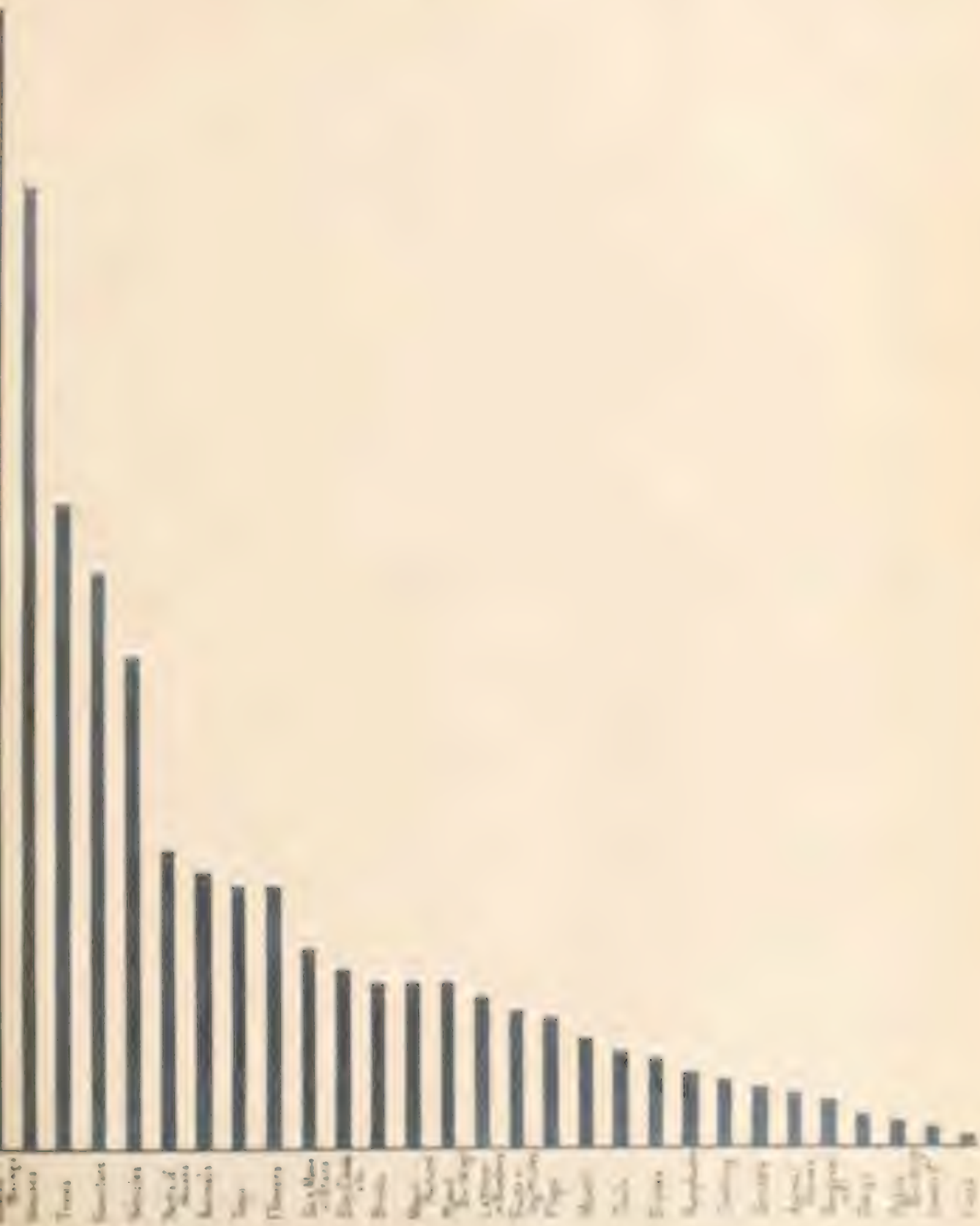




**FOLD OUT**



Figure 1



Summary Showing Percentage of Each Class of Objects Drawn.





Certain constant tendencies are manifested in the range of subjects with age. Of these, the most striking is the steady increase in the number of representations of the human form (31.4, 18.7, 17.1, 14.7, 11.9 & respectively for the four, five, six, seven, and eight year groups). The generic adult form - "man", "a lady", is consistently dominating (11.4, 18.7, 4.4, 8.8, 8.1), while child drawings appear to reach a maximum at six years, declining at seven and eight. Special characters, as the secondary size steadily, though slightly, in value (1.2, 1.4, 1.5, 1.2).

The several classes of nature forms show varying tendencies, but the trend is upward, with few exceptions. Animals, domestic birds, and "miscellaneous nature forms" fluctuate from year to year. Fruits and vegetables, and insects decrease steadily from the fourth to the sixth year; but wild birds, sky, sun, moon, and stars, trees, flowers, and geographical conceptions rise consistently, so that the general tendency of nature forms is steadily upward. (25.3, 27.5, 25.2, 32.7, 37.7 %)

Buildings as drawing subjects also appear more attractive to older children, though with a decided drop at eight years. (14.7, 14.2, 22.5, 22.5, 22.5). This same tendency is seen in the subcategories groups, - houses and miscellaneous buildings - though parts of houses, public buildings and animal houses vary independently. Fishes, flags, and letters and numbers show an upward trend, with slight deviations. Furniture increases until seven years, when there is a slight downward movement. Interest in toys as drawing subjects appears to reach its culmination at five years, decreasing steadily thereafter (4.5, 5.2, 5.5, 2.9, 2.4). Tools, receptacles, clothing and food, miscellaneous forms and designs decline in value consistently from the fourth year to the ninth. The scribbling stage has evidently been outgrown by most children before the fifth year, though it persists in a few cases until eight years (3.7, 1.6, .4, .1, .1).

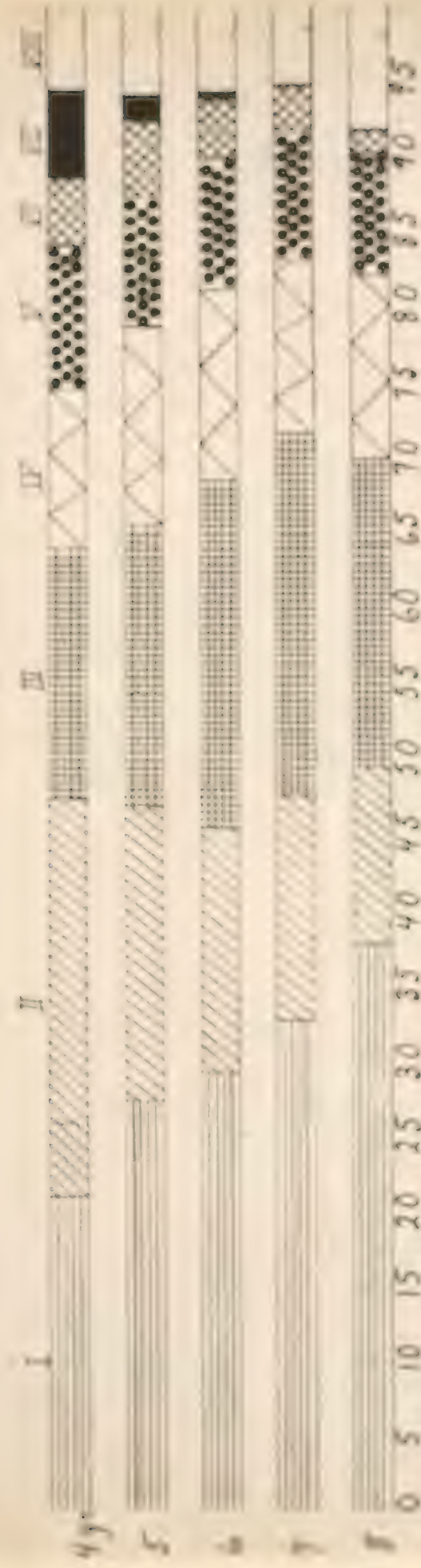
To summarize the most significant of these facts, while the human form steadily diminishes in importance as a mode of expression in drawing, nature in nearly all its phases as steadily increases. Toys and furniture reach their high point of interest at five years, tools and vehicles at six, buildings, at seven. Figure II gives tabular data in graphic form.

While sex differences appear with striking consistency at every age and in every city, these differences are never great. The following summary gives the subjects in which there is an appreciable variation: boys exceed girls in

|                          |        |
|--------------------------|--------|
| Scribbling               | by .24 |
| Adult human figure       | 3.1    |
| Special characters       | .3     |
| Domestic animals         | .4     |
| Wild animals             | .4     |
| Domestic birds           | .3     |
| Sky, clouds, etc.        | .4     |
| Geographical conceptions | .3     |
| Public buildings         | .1     |
| Animal houses            | .3     |
| Miscellaneous buildings  | .3     |
| Vehicles                 | 4.7    |
| Tools                    | .7     |
| Flags                    | .7     |



Figure II



Comparison of Ages for Classes of Subjects Drawn





|                      |         |
|----------------------|---------|
| Girls named boys in  |         |
| Children and babies  | by 2.0% |
| Sun, moon and stars  | .2      |
| Trees                | 1.0     |
| Flowers, unspecified | 2.0     |
| Flowers, specified   | .4      |
| Fruits               | .4      |
| Vegetables           | .1      |
| Miscellaneous nature | .1      |
| Mountains            | .2      |
| Parts of houses      | .2      |
| Furniture            | 4.7     |
| Receptacles          | .2      |
| Toys                 | 1.2     |
| Clothing             | .4      |
| Dishes               | 1.0     |
| Design               | .2      |

Boys and girls chose equally wild birds, insects, fossils, letters and numbers and miscellaneous items. Since an absolute difference of small degree may be more significant in case of a small number than of a larger one, it may be interesting to express the more striking differences as ratios. Selecting those items in which one sex differed from the other by 20% or more, and converting the absolute percentages into the percent which the smaller number was of the larger, we arrive at the following.

TABLE VI.

|                                           | Boys<br>100% | Girls |
|-------------------------------------------|--------------|-------|
| Vehicles and tools                        |              | 22%   |
| Public Buildings                          |              | 50    |
| Special Characters                        |              | 53    |
| Adult human beings                        |              | 55    |
| Animal Houses                             |              | 57    |
| Mountains                                 |              | 70    |
| Animals                                   |              | 73    |
| Sky, clouds, and geographical conceptions |              | 75    |
| Miscellaneous Buildings                   |              | 77    |
| Cartooning                                |              | 80    |
| Flowers                                   | 42           | 170   |
| Furniture and household objects           | 58           |       |
| Design                                    | 57           |       |
| Children and babies                       | 70           |       |
| Toys                                      | 72           |       |
| Fruits and Vegetables                     | 75           |       |

The same facts are represented in Figure 3.

In so far as these differences may be made the basis of generalization, it may be said that boys tend to select for representation objects connected with a wider range of adult social interests; as, adult games



Figure III



See Differences in Sixteen Subjects Absolute Percents Converted into Ratios between the Series Black Boys, White Girls





beliefs, special characters, public buildings and flags. Boys with more frequently select objects of accidental value - vegetables and animals. In drawing from nature, they appear to attend more to the larger aspects, and to animal life. Girls are more likely to select among social interests those relating directly to children itself - children, babies, and toys, and to domestic life - furniture and dishes. In nature they prefer plant life - trees and flowers, fruits and vegetables. While during also the slightly greater interest in design, it might be said that the girls tend toward the esthetic, as the boys toward the mechanical, or scientific aspects of life.

Far more significant than these differences, however, are the correspondences. In only eight classes is there a difference of more than 1% between the choices of the two sexes. In only three, adult human beings, furniture and vehicles is the difference 3% or more. In the last named only does it exceed 3%. Of the twenty-nine classes, five are chosen equally by boys and girls. In twenty-one, the variation is less than 1%; in thirteen it is less than .5%. Moreover, there is no class of objects which has not been selected by both sexes at least thirty times. An examination of the detailed list in Table II shows that the sex line is no where sharply drawn. Boys have selected dolls, doll buggies, hair ribbons, clothes pins, skirts, and willows; while girls have drawn wireless, a threading machine, a gun, a farmer, and doctor. In fact the differences, with few exceptions are so slight as to suggest the accidents of environment as their causes.

The question naturally arises: just how significant are the facts concerning choice of subjects? Obviously, all such data must be regarded as, at least in part, the result of environmental and accidental causes.

First, the influence of the school itself is to be reckoned with. Lincoln's cabin, the Pilgrims, Indian canoes and wigwags are, of course, the outcome of direct instruction. A preponderance of illustrated nursery rhymes, of identical or similar landscapes, of boys skating, in any one school or city grade gives indication of previous art training - frequently of a mental set due to a lesson just received. The tendency to draw something that will please the teacher weighs heavily upon many children.

Next there is the factor of technique, the consciousness of difficulties in the expression of one's real interest, which doubtless impels some children to follow the line of least resistance - to choose something easy, to copy one's neighbor (in spite of the injunction), or to repeat yesterdays' lessons. Technical difficulties do not have weight with most four and five year old children. The spirit of criticism is probably present in a low degree in the maturer five year old, and develops coincidentally with a clearer vision of reality. It is this which has been suggested as the explanation of the increasing tendency to draw the human form - not loss of interest, but a growing consciousness of difficulties, and doubt of one's own ability to surmount them.

There is finally the more subtle, yet far reaching influence of the wider social environment. Valentines, Easter rabbits, Santa's reindeer and Christmas trees mark the progress of the social calendar. Charlie Chaplin, sailors and heroic men are the product of experience beyond the range of schools. Other influences, less measurable, are probably at work determining the sex differences which appear. The fact that



boys, from early childhood, are provided with mechanical toys - balls, wheels, and vehicles of motion, and are exposed to a wider social environment on the street or city pavement; while girls, by social usage, are provided with dolls, toy dishes, furniture, and sewing materials and are more closely confined to the home and the backyard. Would inevitably lead to just such differences as were found - a wider social horizon for the boys, and emphasis on domestic and childish interests for the girls - in so far as the differences were great enough to call for any explanation at all.

That school influence was a potent factor was evident, not only from the similarities in contents within certain schools and systems of schools, but from the range of interests represented. In some cities, the drawings revealed a rich and varied imaginative content; in others, even the maturer children of the second grade were satisfied to trace a box, a square, or a ball, and individuals varied little from the group as a whole. Expressed in numerical terms, in one city only forty different ideas per hundred children were expressed, while in another seven hundred different ideas were indicated. It seems fair to assume that the former city either gave to its children a wider range of interesting experiences, or developed in them greater freedom and power of expression, or both. This suggested a possible dual explanation, which awaits to be substantiated by a knowledge of educational methods in a number of the cities in question. Meagerness of content, may have come as a result of extreme formalism of instruction at the time when the drawings were made. Analysis on the three Rs, allowed little time for enlarging experience, and practically none for self-expression.

At the other extreme were some cities, experimenting with freer organization, where the emphasis on the children's initiative may have limited the range of experience, or children's free choice and free use of materials may have provided too little practice in drawing, or too little guidance in its use. Other causes, for example, the chance selection of classes below normal, may have been operative, though this is not likely to be the case for the classes representing any one city.

In conclusion, it can only be said that certain choices, showing definite tendencies were consistently made by widely separated groups. In the main, these tendencies corroborated the findings of WILLIAM D. HOWES. How far they are the result of innate characteristics, or of the influence of the larger society - heredity versus environment - which must remain unsolved.

COMPOSITIONS: The individual objects making up compositions were included in the foregoing report, but composition itself was reserved for separate treatment. Composition for the purposes of this study was defined broadly as any attempt to create a unified picture, or to portray two or more objects in relation to each other, without regard to aesthetic or interpretive values. The picture might be illustrative of nature, social life, or literature. One drawing is described as "a horse alighting





tree". Neither horse nor tree is recognizable, but by definition the effort, or intention to represent two ideas in relation to one another constitutes the product a composition. The essential problem was the extent to which children of the several ages were interested in representations having narrative or descriptive content, rather than in mere catalogues of unrelated ideas.

Table VIII summarizes the facts, as to the number and general character of compositions, expressed as percents of the total number of drawings (Table I). The table is to be interpreted: Of the total number of four year old boys included in the study (1169) .7% attempted to reproduce a story, .3% a nursery rhyme, .5% some phase of child activity--for example, playing ball, having a tea party --, 1.1% an idea of social or industrial life, and .8% an incident or scene from nature, making a total of 3.4% of four year old children who tried to express ideas in relation to each other.

It is evident that this tendency is not strong in the four year old children, 96.6% of all having chosen either single objects, or numbers of objects unrelated to each other, as parts of a scene or elements of a story. There is a gradual development of the tendency from year to year -- 3.4%, 6.7%, 11.7%, 18.3%, 20.9% respectively, at four, five, six, seven, and eight years. This might have been anticipated from the evidence of the Binet-Simon tests, on the verbal interpretation of pictures. Enumeration is characteristic of the younger children, interpretation in terms of narration or description or better, is expected of the children at seven years. The ability to interpret, however, would presumably precede the ability to represent graphically. A continuation of the study with the mentally maturer eight and nine year old children would probably show marked rise in the curve.

Sex differences are not marked. The girls show slightly greater maturity at each age until eight years, the difference being greatest at six years. The amounts of the difference for the several ages are .4%, .4%, 1.0%, .4% while at eight years the boys lead by .3%.

The subjects of the compositions have been roughly classified into five groups, which are self-explanatory. The general tendency in this respect conforms somewhat closely to that for single objects: the same sex differences are evident in the slightly greater percentage of boys drawing social and industrial subjects, of girls drawing activities relating to child life (with the exception of the six year group), and nature, (except at six and eight years). The girls lead in representation of literature. Again the differences are not marked.

The most striking age difference in the type of composition is in nature subjects, rising from 1% at four years to 9.3% at eight years. Nursery rhymes seem to reach their high point at six years, declining at seven, and remaining stationary at eight. There is however some evidence of class instruction in the drawings of nature scenes and the illustrations to the certain popular nursery rhymes that no definite inference may be made.



**FOLD OUT**





## 11. THE IMPORTANCE OF THE SCALE.

Having established the possibility of certain genuine interests in drawing (whether native or acquired) the next step was the construction of a series of scales for the measurement of abilities. Thus far, no attempt had been taken of differences in merit in the drawings. The interest centered in the mental attitudes evidenced by the intent to represent certain ideas. Differences in merit could be accurately measured only by reference to an objective standard. Such a standard is offered in a drawing scale.

Scales for the measurement of abilities have been in existence since 1910, when Thorndike published his "Scale for the Measurement of the Quality of Handwriting". Dr. Thorndike said in presenting this scale, "At present we can do no better than measure a handwriting as very bad, bad, good, very good, and extremely good, knowing only vaguely what we mean thereby; running the risk of shifting our standards with time, and only by chance meaning the same by the word we use; other students of the facts mean by it. We are in the condition in which students of temperature were before the discovery of the thermometer, or in any other scale for measuring temperature, expressed the very hot, hot, warm, lukewarm, and the like, of subjective opinion."<sup>1</sup>

The twelve years intervening since the publication of this work have seen the rapid development of scale making in two directions: (1) Scales of subjects in which quality of result must be evaluated, commonly known as "product scales," such as handwriting, and English composition; (2) Scales of subjects in which achievement may be measured by definite objective standards of speed and accuracy, such as arithmetic, and spelling; commonly known as "performance scales."

Drawing obviously belongs to the former group. Two drawing scales are already in existence. The Thorndike scale appeared in 1913, and Kilmer-Jones scale in 1922. The question has therefore been asked, "Why not use one of these scales rather than construct a new one?" The answer, relative to the Thorndike scale is two fold. First, this scale is composed of drawings by children from eight to fifteen years of

<sup>1</sup> L. Thorndike, p. 1.



age, widened our interest horizon to the children from four to eight. The lower range of the Thorndike scale, and that eight or nine drawings, successfully covering the work of the lower primary grades, the portrait of the drawings being decidedly poorer than the best achievement of even the four year group. But the upper limit of this scale is considerably better than our worst, and the several upper values are as far superior to our best that the range of two scales is not coincident with our scale. By constructing a new scale, from materials derived from our own group, all the steps up to our needs, and a finer gradation with objectives may be attained.

In the second place, according to Thorndike's statement, his scale is defective in that there is but one series, comprising a variety of subjects, so that it is difficult to determine the exact value of any drawing by comparison with a standard of its own kind. "If we had in the scales a series of drawings of flowers, a series of horses, of back covers, of women, etc., the scale would obviously be more useful to measure the merit of horses, back covers, flowers, and women than it now is."

The Kline-Carey scale, published when ours was well under way, remedies the second difficulty by presenting four series, each made up of drawings of one subject - house, rabbit, boy running, and tree. The scale also comprises drawings from the kindergarten-primary group, but since its upper limit is the high school senior, only a small number of the values are within the range of abilities of our children. A scale constructed with special reference to the abilities of this lower group seems justifiable, as supplementing the more ambitious project.

This scale will be comprised of several subjects, each represented by a graded series of drawings, from the worst to something beyond the probable best achievement of the kindergarten-primary group. In accordance with the evidence of major interests, three subjects were selected. Flowers and houses were easily described and, as the result of all studies of the content of children's drawings. Following the evidence of our own study, trees and the boy became third, but since the latter almost always carried in addition a bird's house - as background of a story, setting for a bird's nest, signet, house, etc. - it was decided that





spontaneous production drawings be used. The scale is thus limited in its application, but within its range, it has more value of application and more secure in its results.

It was further decided, that inasmuch as the drawings of these early years are generally conceived to be representative rather than artistic in purpose, the emphasis in the scales should be upon representation rather than artistic merit. The subjects once selected, the collection of spontaneous drawings was again put into requisition for material from which the scales might be constructed. Such an embarrassing shortage of material presented itself that the first task was to reduce the supply to a workable basis. All the drawings were sorted into four groups - houses, persons, compositions and building towns, and animals. If any one drawing could be placed in two or three groups, it was placed in accordance with its dominant subject. Next, each of the three selected groups was carefully studied, and reduced by a series of eliminations to a manageable size.

1. All drawings which did not conform to the instructions, either in size or tone of paper, omission of color, or use of wax crayon were ruthlessly discarded.

2. In case of the house or person those in which the desired form occurred only as a detail subordinated to other forms were excluded. It was probable that such drawings were not typical of the children's best in representing the single form. Frequently in such drawings the house or person was sketchily drawn, or so small as to give little indication of the child's ability. Moreover, it was thought that judgment would necessarily be biased by the content.

3. In cases where drawings were quite identical in type and general merit, only one of the type was retained. These several deletions reduced the total number of samples in each series to something over 2000.

4. Finally those drawings which were nearly identical in type and general merit were paired, placed face downward, and one of each pair was discarded by chance. The drawings of the upper level of merit, however, were not subjected to this step, since they were neither so numerous, nor so nearly identical in value as those in the middle and lower ranges. A few drawings by children slightly older, or mentally more mature were added to each series, to insure that the final scales would meet the requirements of other, possibly more



gifted children than were. The drawings were comprised 1933 samples of human figures, 1932 of houses, and 1931 of compositions containing trees.

For the further steps in the construction of the scales, the ratings of many competent judges were requisitioned. Three procedures were used: (1) All the drawings were first graded roughly into groups according to merit, the average rating of the several judges being taken as the basis for a further selection in numbers. (2) With the smaller group a second grading into a limited number of values was secured, and further elimination followed. (3) There remained in each series 34 drawings, ranging from the poorest to the best, and, by the crude methods thus far employed, separated by fairly equal steps. These were now subjected to a more careful scrutiny, and arranged in serial order according to merit, by a larger number of judges. On the basis of these ratings the scales were made.

1. To describe the process in detail: for the 1st step, the 1933 or more samples were graded by twelve teachers, each of whom received the following instructions:

"Make ten groups of the drawings such that each group is separated from the next in merit by approximately an equal amount. In other words sort the drawings into ten groups ranging from the best to the worst. In case any drawing has absolutely no merit, place it in a zero group. If any seems to you to have even less than zero merit, place it in a still lower group. If any drawing stands out as markedly better than the highest group place it in a separate class. You will thus have possibly thirteen groups. In evaluating, each drawing is to be considered from the standpoint of its representative value, not artistic merit. Insofar as detail, accuracy, perspective, and proportion, enter into its merit as the expression of an idea, these should be considered, and no further."

Table IX shows the total score for each drawing of the three series, as rated by these first judges. These distributions only very roughly approximate the normal curve - a result which was to be expected from the method of selection of the samples, since many of these in the middle range of values had been eliminated. The average scores may be obtained by dividing each score by twelve. To determine the reliability of the judgments, the first two hundred scores, in each series, which were assumed to be a random sampling of all the scores, (the order was purely chance arrangement) were used. The





TABLE 22. DISTRIBUTION OF WINDS AT FORT TERRY, TEXAS.

| Persons | Houses | Companies | Stores and<br>barns | Persons | Houses | Companies | Stores and<br>barns | Persons | Houses | Companies | Stores and<br>barns |
|---------|--------|-----------|---------------------|---------|--------|-----------|---------------------|---------|--------|-----------|---------------------|
| 1       | 1      | 1         | 1                   | 10      | 11     | 21        | 35                  | 1       | 1      | 1         | 1                   |
| 2       | 1      | 1         | 1                   | 10      | 23     | 14        | 36                  | 1       | 1      | 1         | 1                   |
| 3       | 1      | 1         | 1                   | 10      | 19     | 16        | 37                  | 1       | 1      | 1         | 1                   |
| 4       | 1      | 1         | 1                   | 14      | 27     | 14        | 38                  | 1       | 1      | 1         | 1                   |
| 5       | 1      | 1         | 1                   | 12      | 24     | 22        | 39                  | 1       | 1      | 1         | 1                   |
| 6       | 1      | 1         | 1                   | 12      | 20     | 13        | 40                  | 1       | 1      | 1         | 1                   |
| 7       | 1      | 1         | 1                   | 13      | 18     | 17        | 41                  | 1       | 1      | 1         | 1                   |
| 8       | 1      | 1         | 1                   | 13      | 15     | 8         | 42                  | 1       | 1      | 1         | 1                   |
| 9       | 1      | 1         | 1                   | 12      | 15     | 16        | 43                  | 1       | 1      | 1         | 1                   |
| 10      | 1      | 1         | 1                   | 7       | 22     | 15        | 44                  | 1       | 1      | 1         | 1                   |
| 11      | 1      | 1         | 1                   | 7       | 25     | 15        | 45                  | 1       | 1      | 1         | 1                   |
| 12      | 1      | 1         | 1                   | 9       | 24     | 12        | 46                  | 1       | 1      | 1         | 1                   |
| 13      | 1      | 1         | 1                   | 6       | 18     | 16        | 47                  | 1       | 1      | 1         | 1                   |
| 14      | 1      | 1         | 1                   | 10      | 19     | 23        | 48                  | 1       | 1      | 1         | 1                   |
| 15      | 1      | 1         | 1                   | 12      | 15     | 12        | 49                  | 1       | 1      | 1         | 1                   |
| 16      | 1      | 1         | 1                   | 8       | 25     | 22        | 50                  | 1       | 1      | 1         | 1                   |
| 17      | 1      | 1         | 1                   | 10      | 17     | 12        | 51                  | 1       | 1      | 1         | 1                   |
| 18      | 1      | 1         | 1                   | 7       | 20     | 25        | 52                  | 1       | 1      | 1         | 1                   |
| 19      | 1      | 1         | 1                   | 7       | 19     | 14        | 53                  | 1       | 1      | 1         | 1                   |
| 20      | 1      | 1         | 1                   | 7       | 21     | 14        | 54                  | 1       | 1      | 1         | 1                   |
| 21      | 1      | 1         | 1                   | 7       | 23     | 11        | 55                  | 1       | 1      | 1         | 1                   |
| 22      | 1      | 1         | 1                   | 5       | 22     | 11        | 56                  | 1       | 1      | 1         | 1                   |
| 23      | 1      | 1         | 1                   | 6       | 4      | 15        | 57                  | 1       | 1      | 1         | 1                   |
| 24      | 1      | 1         | 1                   | 7       | 15     | 16        | 58                  | 1       | 1      | 1         | 1                   |
| 25      | 1      | 1         | 1                   | 11      | 11     | 13        | 59                  | 1       | 1      | 1         | 1                   |
| 26      | 1      | 1         | 1                   | 8       | 7      | 10        | 60                  | 1       | 1      | 1         | 1                   |
| 27      | 1      | 1         | 1                   | 8       | 12     | 14        | 61                  | 1       | 1      | 1         | 1                   |
| 28      | 1      | 1         | 1                   | 2       | 8      | 17        | 62                  | 1       | 1      | 1         | 1                   |
| 29      | 1      | 1         | 1                   | 2       | 11     | 11        | 63                  | 1       | 1      | 1         | 1                   |
| 30      | 1      | 1         | 1                   | 2       | 6      | 15        | 64                  | 1       | 1      | 1         | 1                   |
| 31      | 1      | 1         | 1                   | 2       | 6      | 16        | 65                  | 1       | 1      | 1         | 1                   |
| 32      | 1      | 1         | 1                   | 2       | 6      | 16        | 66                  | 1       | 1      | 1         | 1                   |
| 33      | 1      | 1         | 1                   | 2       | 6      | 16        | 67                  | 1       | 1      | 1         | 1                   |
| 34      | 1      | 1         | 1                   | 2       | 6      | 16        | 68                  | 1       | 1      | 1         | 1                   |
| 35      | 1      | 1         | 1                   | 2       | 6      | 16        | 69                  | 1       | 1      | 1         | 1                   |
| 36      | 1      | 1         | 1                   | 2       | 6      | 16        | 70                  | 1       | 1      | 1         | 1                   |
| 37      | 1      | 1         | 1                   | 2       | 6      | 16        | 71                  | 1       | 1      | 1         | 1                   |
| 38      | 1      | 1         | 1                   | 2       | 6      | 16        | 72                  | 1       | 1      | 1         | 1                   |
| 39      | 1      | 1         | 1                   | 2       | 6      | 16        | 73                  | 1       | 1      | 1         | 1                   |
| 40      | 1      | 1         | 1                   | 2       | 6      | 16        | 74                  | 1       | 1      | 1         | 1                   |
| 41      | 1      | 1         | 1                   | 2       | 6      | 16        | 75                  | 1       | 1      | 1         | 1                   |
| 42      | 1      | 1         | 1                   | 2       | 6      | 16        | 76                  | 1       | 1      | 1         | 1                   |
| 43      | 1      | 1         | 1                   | 2       | 6      | 16        | 77                  | 1       | 1      | 1         | 1                   |
| 44      | 1      | 1         | 1                   | 2       | 6      | 16        | 78                  | 1       | 1      | 1         | 1                   |
| 45      | 1      | 1         | 1                   | 2       | 6      | 16        | 79                  | 1       | 1      | 1         | 1                   |
| 46      | 1      | 1         | 1                   | 2       | 6      | 16        | 80                  | 1       | 1      | 1         | 1                   |
| 47      | 1      | 1         | 1                   | 2       | 6      | 16        | 81                  | 1       | 1      | 1         | 1                   |
| 48      | 1      | 1         | 1                   | 2       | 6      | 16        | 82                  | 1       | 1      | 1         | 1                   |
| 49      | 1      | 1         | 1                   | 2       | 6      | 16        | 83                  | 1       | 1      | 1         | 1                   |
| 50      | 1      | 1         | 1                   | 2       | 6      | 16        | 84                  | 1       | 1      | 1         | 1                   |
| 51      | 1      | 1         | 1                   | 2       | 6      | 16        | 85                  | 1       | 1      | 1         | 1                   |
| 52      | 1      | 1         | 1                   | 2       | 6      | 16        | 86                  | 1       | 1      | 1         | 1                   |
| 53      | 1      | 1         | 1                   | 2       | 6      | 16        | 87                  | 1       | 1      | 1         | 1                   |
| 54      | 1      | 1         | 1                   | 2       | 6      | 16        | 88                  | 1       | 1      | 1         | 1                   |
| 55      | 1      | 1         | 1                   | 2       | 6      | 16        | 89                  | 1       | 1      | 1         | 1                   |
| 56      | 1      | 1         | 1                   | 2       | 6      | 16        | 90                  | 1       | 1      | 1         | 1                   |
| 57      | 1      | 1         | 1                   | 2       | 6      | 16        | 91                  | 1       | 1      | 1         | 1                   |
| 58      | 1      | 1         | 1                   | 2       | 6      | 16        | 92                  | 1       | 1      | 1         | 1                   |
| 59      | 1      | 1         | 1                   | 2       | 6      | 16        | 93                  | 1       | 1      | 1         | 1                   |
| 60      | 1      | 1         | 1                   | 2       | 6      | 16        | 94                  | 1       | 1      | 1         | 1                   |
| 61      | 1      | 1         | 1                   | 2       | 6      | 16        | 95                  | 1       | 1      | 1         | 1                   |
| 62      | 1      | 1         | 1                   | 2       | 6      | 16        | 96                  | 1       | 1      | 1         | 1                   |
| 63      | 1      | 1         | 1                   | 2       | 6      | 16        | 97                  | 1       | 1      | 1         | 1                   |
| 64      | 1      | 1         | 1                   | 2       | 6      | 16        | 98                  | 1       | 1      | 1         | 1                   |
| 65      | 1      | 1         | 1                   | 2       | 6      | 16        | 99                  | 1       | 1      | 1         | 1                   |
| 66      | 1      | 1         | 1                   | 2       | 6      | 16        | 100                 | 1       | 1      | 1         | 1                   |
| 67      | 1      | 1         | 1                   | 2       | 6      | 16        | 101                 | 1       | 1      | 1         | 1                   |
| 68      | 1      | 1         | 1                   | 2       | 6      | 16        | 102                 | 1       | 1      | 1         | 1                   |
| 69      | 1      | 1         | 1                   | 2       | 6      | 16        | 103                 | 1       | 1      | 1         | 1                   |
| 70      | 1      | 1         | 1                   | 2       | 6      | 16        | 104                 | 1       | 1      | 1         | 1                   |
| 71      | 1      | 1         | 1                   | 2       | 6      | 16        | 105                 | 1       | 1      | 1         | 1                   |
| 72      | 1      | 1         | 1                   | 2       | 6      | 16        | 106                 | 1       | 1      | 1         | 1                   |
| 73      | 1      | 1         | 1                   | 2       | 6      | 16        | 107                 | 1       | 1      | 1         | 1                   |
| 74      | 1      | 1         | 1                   | 2       | 6      | 16        | 108                 | 1       | 1      | 1         | 1                   |
| 75      | 1      | 1         | 1                   | 2       | 6      | 16        | 109                 | 1       | 1      | 1         | 1                   |
| 76      | 1      | 1         | 1                   | 2       | 6      | 16        | 110                 | 1       | 1      | 1         | 1                   |
| 77      | 1      | 1         | 1                   | 2       | 6      | 16        | 111                 | 1       | 1      | 1         | 1                   |
| 78      | 1      | 1         | 1                   | 2       | 6      | 16        | 112                 | 1       | 1      | 1         | 1                   |
| 79      | 1      | 1         | 1                   | 2       | 6      | 16        | 113                 | 1       | 1      | 1         | 1                   |
| 80      | 1      | 1         | 1                   | 2       | 6      | 16        | 114                 | 1       | 1      | 1         | 1                   |
| 81      | 1      | 1         | 1                   | 2       | 6      | 16        | 115                 | 1       | 1      | 1         | 1                   |
| 82      | 1      | 1         | 1                   | 2       | 6      | 16        | 116                 | 1       | 1      | 1         | 1                   |
| 83      | 1      | 1         | 1                   | 2       | 6      | 16        | 117                 | 1       | 1      | 1         | 1                   |
| 84      | 1      | 1         | 1                   | 2       | 6      | 16        | 118                 | 1       | 1      | 1         | 1                   |
| 85      | 1      | 1         | 1                   | 2       | 6      | 16        | 119                 | 1       | 1      | 1         | 1                   |
| 86      | 1      | 1         | 1                   | 2       | 6      | 16        | 120                 | 1       | 1      | 1         | 1                   |
| 87      | 1      | 1         | 1                   | 2       | 6      | 16        | 121                 | 1       | 1      | 1         | 1                   |
| 88      | 1      | 1         | 1                   | 2       | 6      | 16        | 122                 | 1       | 1      | 1         | 1                   |
| 89      | 1      | 1         | 1                   | 2       | 6      | 16        | 123                 | 1       | 1      | 1         | 1                   |
| 90      | 1      | 1         | 1                   | 2       | 6      | 16        | 124                 | 1       | 1      | 1         | 1                   |
| 91      | 1      | 1         | 1                   | 2       | 6      | 16        | 125                 | 1       | 1      | 1         | 1                   |
| 92      | 1      | 1         | 1                   | 2       | 6      | 16        | 126                 | 1       | 1      | 1         | 1                   |
| 93      | 1      | 1         | 1                   | 2       | 6      | 16        | 127                 | 1       | 1      | 1         | 1                   |
| 94      | 1      | 1         | 1                   | 2       | 6      | 16        | 128                 | 1       | 1      | 1         | 1                   |
| 95      | 1      | 1         | 1                   | 2       | 6      | 16        | 129                 | 1       | 1      | 1         | 1                   |
| 96      | 1      | 1         | 1                   | 2       | 6      | 16        | 130                 | 1       | 1      | 1         | 1                   |
| 97      | 1      | 1         | 1                   | 2       | 6      | 16        | 131                 | 1       | 1      | 1         | 1                   |
| 98      | 1      | 1         | 1                   | 2       | 6      | 16        | 132                 | 1       | 1      | 1         | 1                   |
| 99      | 1      | 1         | 1                   | 2       | 6      | 16        | 133                 | 1       | 1      | 1         | 1                   |
| 100     | 1      | 1         | 1                   | 2       | 6      | 16        | 134                 | 1       | 1      | 1         | 1                   |
| 101     | 1      | 1         | 1                   | 2       | 6      | 16        | 135                 | 1       | 1      | 1         | 1                   |
| 102     | 1      | 1         | 1                   | 2       | 6      | 16        | 136                 | 1       | 1      | 1         | 1                   |
| 103     | 1      | 1         | 1                   | 2       | 6      | 16        | 137                 | 1       | 1      | 1         | 1                   |
| 104     | 1      | 1         | 1                   | 2       | 6      | 16        | 138                 | 1       | 1      | 1         | 1                   |
| 105     | 1      | 1         | 1                   | 2       | 6      | 16        | 139                 | 1       | 1      | 1         | 1                   |
| 106     | 1      | 1         | 1                   | 2       | 6      | 16        | 140                 | 1       | 1      | 1         | 1                   |
| 107     | 1      | 1         | 1                   | 2       | 6      | 16        | 141                 | 1       | 1      | 1         | 1                   |
| 108     | 1      | 1         | 1                   | 2       | 6      | 16        | 142                 | 1       | 1      | 1         | 1                   |
| 109     | 1      | 1         | 1                   | 2       | 6      | 16        | 143                 | 1       | 1      | 1         | 1                   |
| 110     | 1      | 1         | 1                   | 2       | 6      | 16        | 144                 | 1       | 1      | 1         | 1                   |
| 111     | 1      | 1         | 1                   | 2       | 6      | 16        | 145                 | 1       | 1      | 1         | 1                   |
| 112     | 1      | 1         | 1                   | 2       | 6      | 16        | 146                 | 1       | 1      | 1         | 1                   |
| 113     | 1      | 1         | 1                   | 2       | 6      | 16        | 147                 | 1       | 1      | 1         | 1                   |
| 114     | 1      | 1         | 1                   | 2       | 6      | 16        | 148                 | 1       | 1      | 1         | 1                   |
| 115     | 1      | 1         | 1                   | 2       | 6      | 16        | 149                 | 1       | 1      | 1         | 1                   |
| 116     | 1      | 1         | 1                   | 2       | 6      | 16        | 150                 | 1       | 1      | 1         | 1                   |
| 117     | 1      | 1         | 1                   | 2       | 6      | 16        | 151                 | 1       | 1      | 1         | 1                   |
| 118     | 1      | 1         | 1                   | 2       | 6      | 16        | 152                 | 1       | 1      | 1         | 1                   |
| 119     | 1      | 1         | 1                   | 2       | 6      | 16        | 153                 | 1       | 1      | 1         | 1                   |
| 120     | 1      | 1         | 1                   | 2       | 6      | 16        | 154                 | 1       | 1      | 1         | 1                   |
| 121     | 1      | 1         | 1                   | 2       | 6      | 16        | 155                 | 1       | 1      | 1         | 1                   |
| 122     | 1      | 1         | 1                   | 2       | 6      | 16        | 156                 | 1       | 1      | 1         | 1                   |
| 123     | 1      | 1         | 1                   | 2       | 6      | 16        | 157                 | 1       | 1      | 1         | 1                   |
| 124     | 1      | 1         | 1                   | 2       | 6      | 16        | 158                 | 1       | 1      | 1         | 1                   |
| 125     | 1      | 1         | 1                   | 2       | 6      | 16        | 159                 | 1       | 1      | 1         | 1                   |
| 126     | 1      | 1         | 1                   | 2       | 6      | 16        | 160                 | 1       | 1      | 1         | 1                   |
| 127     | 1      | 1         | 1                   | 2       | 6      | 16        | 161                 | 1       | 1      | 1         | 1                   |
| 128     | 1      | 1         | 1                   | 2       | 6      | 16        | 162                 | 1       | 1      | 1         | 1                   |
| 129     | 1      | 1         | 1                   | 2       | 6      | 16        | 163                 | 1       | 1      | 1         | 1                   |
| 130     | 1      | 1         | 1                   | 2       | 6      | 16        | 164                 | 1       | 1      | 1         | 1                   |
| 131     | 1      | 1         | 1                   | 2       | 6      | 16        | 165                 | 1       | 1      | 1         | 1                   |
| 132     | 1      | 1         | 1                   | 2       | 6      | 16        | 166                 | 1       | 1      | 1         | 1                   |
| 133     | 1      | 1         | 1                   | 2       | 6      | 16        | 167                 | 1       | 1      | 1         | 1                   |
| 134     | 1      | 1         | 1                   | 2       | 6      | 16        | 168                 | 1       | 1      | 1         | 1                   |
| 135     | 1      | 1         | 1                   | 2       | 6      | 16        | 169                 | 1       | 1      | 1         | 1                   |
| 136     | 1      | 1         | 1                   | 2       | 6      | 16        | 170                 | 1       | 1      | 1         | 1                   |
| 137     | 1      | 1         | 1                   | 2       | 6      | 16        | 171                 | 1       | 1      | 1         | 1                   |
| 138     | 1      | 1         | 1                   | 2       | 6      | 16        | 172                 | 1       | 1      | 1         | 1                   |
| 139     | 1      | 1         | 1                   | 2       | 6      | 16        | 173                 | 1       | 1      | 1         | 1                   |
| 140     | 1      | 1         | 1                   | 2       | 6      | 16        | 174                 | 1       | 1      | 1         | 1                   |
| 141     | 1      | 1         | 1                   | 2       | 6      | 16        | 175                 | 1       | 1      | 1         | 1                   |
| 142     | 1      | 1         | 1                   | 2       | 6      | 16        | 176                 | 1       | 1      | 1         | 1                   |
| 143     | 1      | 1         | 1                   | 2       | 6      | 16        | 177                 | 1       | 1      | 1         | 1                   |
| 144     | 1      | 1         | 1                   | 2       | 6      | 16        | 178                 | 1       | 1      | 1         | 1                   |
| 145     | 1      | 1         | 1                   | 2       | 6      | 16        | 179                 | 1       | 1      | 1         | 1                   |
| 146     | 1      | 1         | 1                   | 2       | 6      | 16        | 180                 | 1       | 1      | 1         | 1                   |
| 147     | 1      | 1         | 1                   | 2       | 6      | 16        | 181                 | 1       | 1      | 1         | 1                   |
| 148     | 1      | 1         | 1                   | 2       | 6      | 16        | 182                 | 1       | 1      | 1         | 1                   |
| 149     | 1      | 1         | 1                   | 2       | 6      | 16        | 183                 | 1       | 1      | 1         | 1                   |
| 150     | 1      | 1         | 1                   | 2       | 6      | 16        | 184                 | 1       | 1      | 1         | 1                   |
| 151     | 1      | 1         | 1                   | 2       | 6      | 16        | 1                   |         |        |           |                     |



twelve judgments were divided, also by groups, into the groups of six judgments each, and the two averages were calculated for each drawing. The two sets of averages were then correlated, using the Pearson Formula  $R = \frac{\sum XY}{\sqrt{\sum X^2 \sum Y^2}}$ .

$$R = \frac{\sum XY}{\sqrt{\sum X^2 \sum Y^2}}$$

in which  $X$  represents the several values of the first number to be correlated,  $Y$  represents the corresponding values of the second number, and  $N$  the number of cases. The coefficients were for drawing, .987, for writing, .954, for compositions, .911; with probable errors respectively, .0031, .0043, and .0115.

One drawing was then selected from each rank, on the basis of least deviation from the average score. In the extreme upper and lower ranks however, some drawings having the same rank were retained, because of the slight gaps in the distribution and the more varied character of the samples. This gave three sets of drawings, which by the average rating of the twelve judges represented graded series of approximately equal steps. The method was not refined, but was considered valid merely for purposes of elimination to a practical working series. The new groupings contained 158 drawings of persons, 125 of houses, and 125 of compositions.

2. The next step was the grading of these smaller series by a larger number of judges. The instructions were the same, except that only eleven groups were to be made - one for zero and ten for higher degrees of merit. Thirty judges rated each of these series, but the treatment of the results was by more refined method of the percentages of better and worse judgments. This method, first applied to music rating by Thorndike, is based upon the theory advanced by Pillsbury and Osell, that "differences which are usually often noticed are equal unless they are always noticed or never noticed."

Thirty high schools - teachers or supervisors of kindergarten or primary grades, or of art - rated these sets. The values were then compared by determining just how many judges rated each drawing as better than, equal to or worse than every other drawing in its own series. These drawings in each set were then selected which represented a graded series, of which each member had been rated as better than the one next below, by approximately 75% of the judges. Equal judgments were converted into better or worse judgments by taking the average of the figures - one derived by dividing the equal judgments equally





thereafter, by dividing them proportionally between the better and worse judgments between the better and worse judgments. Thirty-four samples were retained in each series.

3. These thirty-four samples were then submitted to a larger group of judges for rating on a more refined scale. The instructions at this stage were: "Arrange the drawings in a series from the best to the worst, as they, according to your judgment, each drawing represents a lesser degree of merit than the one preceding. In judging houses and persons, ignore all details of background, considering only the house or person. The basis of judgment in every case is to be representative value, or meaning, rather than artistic value. Determine which one of the drawings represents the nearest approach to zero value, zero being defined as an attempt to represent the ideal, with just not any merit as representation."

In the preceding stages, the original drawings were used, the samples subjected to the second rating have been mounted on good quality tag-board for preservation. For the third rating, the samples were photographed. Thus the wear and tear on the original drawings was obviated, and, ten photo-copies were made from every sample, the process of judging was considerably expedited.

Thirty judges rated the houses, seventy-two the persons, and eighty-four the compositions. The percentages of better and worse judgments are again computed for each pair in each series. The samples were discarded whose percentages approached 50 or 100, on the assumption that a difference noted by 50% of judges means equality in the two samples, and a difference approaching 100% of agreement is tantamount with a high degree of unreliability, 75% agreement being taken as the point of maximum reliability - gave a P.E. value of 1.00. These samples were retained which formed a limited series, each specimen of which was rated as better than the one below by approximately 75% of the judges.

The specimen with a median rating of zero was next determined for each series. The P.E. distances of each sample above the drawing rated at zero was then computed. This was obtained its scale value.

Tables X, XI, and XII, give the data for the samples finally selected for the three series. The composition series is least reliable, for only 15 out of 84 judges gave the P.E. value



approx. 1.40. In both cases, the percentage of agreement is considerably higher, in the remaining cases it is considerably lower - ranging from 66.7 to 88.9. Since this factor gives a degree of difference noted by several more than half the judges, it is evident that the application of more standards will have less reliability than those for houses and persons. Finally in order to assess the applicability of the three scales were directly comparable in application to greatest problems, the scales for composition were utilized by two. This in no way affects the reliability of the scale values. The scales themselves are presented in Figures IV, V, and VI.

In a number of cases in each series, two drawings had approximately equal rank. In such cases, the rejected drawing frequently appeared to have value as complementing the one selected - giving a sample of somewhat different type - for example, a man in profile, a house with gable roof, where the chosen sample was flat roofed, etc. These drawings are presented in Figures IVA, VA, and VIA.





Table 12 shows the relative values assigned by the three groups of judges to the 18 drawings forming the scale of "human beings", converted into judgments of better, worse and equal. The drawings are numbered to be the original series. Columns 1 - 3 give the ratings of the first twelve judges. Reading from the column, drawing No. 45, the best of the series, was rated better than No. 94, the worst last, by nine of the twelve judges; No. 94 was rated better than No. 51, which is third last, by ten of the twelve judges, etc. The second column shows the number of judges who considered the drawing worse than the one below, the third shows the value of judges who placed the two drawings in the same group.

Columns 4 - 5 give the same data for the 20 judges who rated the earlier number of drawings. Columns 6 - 7 combine the results of the preceding columns. Columns 10 - 12 attempt to convert the equal judgments into better or worse judgments, so as to make these 42 judgments comparable to those of the 20-judge panel. In 10 of the equal judgments one drawing was judged equally better than the other last worse. This, however, consistently distorts the results, since the drawings are not, in these instances, but have directly compared with one another, the drawing which was rated higher by the greater number of judges would have been rated higher by a proportionately greater number of those who placed the two drawings in the same rank. Column 11 distributed the equal judgments on this latter principle. For example, if 70% of those who rated the two drawings as unequal in merit rated drawing A as better than B, then 70% of the equal ratings were assigned to A, and 30% to B. This method probably distorts the results in the opposite direction, especially in those cases where all or nearly all the judgments were either better or equal, and where therefore, all the equal judgments were thrown with the better ones. Column 12 is a compromise made by taking the average of the two preceding columns. This conversion has been made merely to show the amount of correlation between the groups of ratings, the twelve and twenty judges rated the drawings by placing them in from 11 to 18 groups. The probability is that few of the drawings were directly compared with one another; and, moreover the small number of groups allowed, of necessarily three together in one group drawings of several degrees of merit. Therefore these ratings were used only for the purpose of establishing the smaller series from which the smaller sets constructed. They were not included in the final comparison for the scales, but the correspondence to the two sets of ratings, which are given side by side in columns 12 and 13, is considerable. It will be seen that with the exception of one pair of drawings of human beings, and 2 pairs of compositions, the two sets of judges agree on the superior merit of the better drawing of each pair. The correlation coefficient for the three series--human beings, houses, and compositions--respectively is .81, .82, .88.

Tables 11a, 11b and 11c give the steps by which the scale values were determined. Column 1 repeats the summary of the ratings of the first judges. Column 2 shows the P. E., based upon this preliminary difference between each pair of drawings. In column 3 the actual scale value of each drawing is computed by adding the P. E. value to the sum of those below it in rank. Column 4 shows the value finally assigned, which is that of column 3 reduced to one-fourth place.



| 12 Original Judges. |      |      |      | 30 Judges. |      |      |      | 12-30 Judges Combined |       |       |       | Greater number of judges - results divided equally between both - 1 & more. | Greater number of judges - results divided equally between both - 1 & more. | TABLE I              |  | Greater number of judges - results divided equally between both - 1 & more. |
|---------------------|------|------|------|------------|------|------|------|-----------------------|-------|-------|-------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------|--|-----------------------------------------------------------------------------|
| 1st.                | 2nd. | 3rd. | 4th. | 5th.       | 6th. | 7th. | 8th. | 9th.                  | 10th. | 11th. | 12th. | 13th.                                                                       | 14th.                                                                       | Average of last ten. |  | Greater number of judges - results divided equally between both - 1 & more. |
| 2                   | 0    | 3    | 19   | 0          | 11   | 28   | 0    | 14                    |       | 85.3  | 100.0 | 91.7                                                                        | 93.0                                                                        |                      |  |                                                                             |
| 10                  | 0    | 3    | 19   | 1          | 0    | 39   | 1    | 2                     |       | 98.2  | 97.5  | 94.4                                                                        | 77.2                                                                        |                      |  |                                                                             |
| 3                   | 6    | 3    | 13   | 6          | 11   | 16   | 12   | 14                    |       | 54.8  | 57.1  | 58.0                                                                        | 61.1                                                                        |                      |  |                                                                             |
| 12                  | 0    | 0    | 26   | 4          | 0    | 38   | 4    | 0                     |       | 90.5  | 90.5  | 90.5                                                                        | 77.7                                                                        |                      |  |                                                                             |
| 10                  | 1    | 1    | 23   | 4          | 3    | 33   | 5    | 4                     |       | 83.3  | 84.9  | 85.1                                                                        | 80.5                                                                        |                      |  |                                                                             |
| 6                   | 0    | 6    | 9    | 5          | 16   | 15   | 6    | 22                    |       | 61.9  | 75.0  | 68.5                                                                        | 69.4                                                                        |                      |  |                                                                             |
| 5                   | 1    | 6    | 8    | 6          | 16   | 13   | 7    | 22                    |       | 57.1  | 65.0  | 61.1                                                                        | 72.2                                                                        |                      |  |                                                                             |
| 2                   | 2    | 8    | 15   | 3          | 12   | 17   | 5    | 20                    |       | 64.3  | 77.3  | 70.8                                                                        | 60.5                                                                        |                      |  |                                                                             |
| 3                   | 2    | 7    | 11   | 2          | 17   | 14   | 4    | 24                    |       | 61.9  | 77.8  | 69.9                                                                        | 84.7                                                                        |                      |  |                                                                             |
| 10                  | 0    | 2    | 18   | 0          | 12   | 28   | 0    | 14                    |       | 93.3  | 100.0 | 91.7                                                                        | 83.3                                                                        |                      |  |                                                                             |
| 3                   | 2    | 7    | 11   | 5          | 14   | 14   | 7    | 21                    |       | 58.3  | 66.7  | 62.5                                                                        | 72.2                                                                        |                      |  |                                                                             |
| 1                   | 3    | 3    | 7    | 2          | 21   | 6    | 4    | 30                    |       | 54.6  | 66.7  | 60.9                                                                        | 73.4                                                                        |                      |  |                                                                             |
| 7                   | 0    | 5    | 8    | 2          | 20   | 15   | 2    | 25                    |       | 65.8  | 88.2  | 76.9                                                                        | 80.5                                                                        |                      |  |                                                                             |
| 7                   | 1    | 4    | 20   | 1          | 9    | 27   | 2    | 13                    |       | 79.8  | 93.1  | 86.6                                                                        | 97.3                                                                        |                      |  |                                                                             |
| 1                   | 2    | 9    | 5    | 11         | 14   | 6    | 13   | 23                    |       | 41.7  | 31.6  | 36.7                                                                        | 76.4                                                                        |                      |  |                                                                             |
| 4                   | 0    | 8    | 16   | 0          | 14   | 20   | 0    | 22                    |       | 73.6  | 100.0 | 86.9                                                                        | 91.7                                                                        |                      |  |                                                                             |
| 1                   | 0    | 11   | 7    | 1          | 22   | 8    | 1    | 33                    |       | 58.3  | 88.8  | 73.6                                                                        | 91.7                                                                        |                      |  |                                                                             |

| 1st.     | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11)  | (12)  | (13) |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-------|-------|------|
| TABLE XI |     |     |     |     |     |     |     |     |     |      |       |       |      |
| 9        | 0   | 3   | 16  | 0   | 12  | 27  | 0   | 15  |     | 82.1 | 100.0 | 91.1. | 93.3 |
| 4        | 3   | 5   | 7   | 12  | 11  | 11  | 15  | 16  |     | 45.2 | 56.6  | 50.9  | 71.7 |
| 11       | 1   | 0   | 18  | 2   | 10  | 29  | 3   | 10  |     | 81.0 | 90.6  | 85.8  | 85.0 |
| 8        | 3   | 1   | 20  | 3   | 7   | 28  | 6   | 8   |     | 76.2 | 82.3  | 79.3  | 73.3 |
| 7        | 2   | 3   | 16  | 5   | 9   | 23  | 7   | 12  |     | 69.0 | 76.7  | 72.9  | 76.0 |
| 7        | 3   | 2   | 13  | 4   | 13  | 20  | 7   | 15  |     | 65.5 | 74.1  | 69.8  | 85.0 |
| 9        | 1   | 2   | 22  | 3   | 5   | 31  | 4   | 7   |     | 82.1 | 88.6  | 85.4  | 78.3 |
| 4        | 2   | 6   | 13  | 4   | 13  | 17  | 6   | 19  |     | 63.1 | 73.9  | 68.5  | 78.3 |
| 9        | 0   | 3   | 21  | 3   | 6   | 30  | 3   | 9   |     | 82.1 | 90.9  | 85.5  | 78.3 |
| 6        | 1   | 3   | 14  | 6   | 10  | 22  | 7   | 13  |     | 67.9 | 75.9  | 71.9  | 83.3 |
| 3        | 2   | 7   | 11  | 6   | 13  | 14  | 8   | 20  |     | 57.1 | 63.7  | 60.4  | 73.3 |
| 7        | 0   | 5   | 16  | 3   | 11  | 23  | 3   | 16  |     | 73.8 | 88.5  | 81.2  | 75.0 |
| 4        | 0   | 8   | 11  | 1   | 16  | 15  | 1   | 26  |     | 66.7 | 93.8  | 80.4  | 63.3 |
| 3        | 1   | 8   | 12  | 0   | 18  | 15  | 1   | 26  |     | 66.7 | 93.8  | 80.4  | 93.3 |
| 3        | 2   | 7   | 9   | 2   | 19  | 12  | 4   | 26  |     | 59.5 | 75.0  | 67.3  | 85.3 |
| 5        | 0   | 7   | 11  | 0   | 19  | 16  | 0   | 26  |     | 73.8 | 100.0 | 86.9  | 98.3 |

| 1st.      | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| TABLE XII |     |     |     |     |     |     |     |     |     |      |      |      |      |
| 3         | 3   | 6   | 8   | 10  | 12  | 11  | 13  | 18  |     | 47.6 | 45.7 | 46.7 | 66.7 |
| 9         | 0   | 3   | 15  | 6   | 8   | 24  | 6   | 12  |     | 71.4 | 74.3 | 72.9 | 59.5 |
| 8         | 2   | 2   | 21  | 5   | 4   | 29  | 7   | 6   |     | 76.2 | 80.3 | 78.4 | 64.3 |
| 9         | 4   | 1   | 18  | 10  | 4   | 21  | 18  | 8   |     | 88.2 | 90.2 | 86.4 | 87.9 |
| 8         | 1   | 3   | 22  | 5   | 3   | 30  | 6   | 6   |     | 78.0 | 83.3 | 81.0 | 76.2 |
| 5         | 2   | 5   | 14  | 8   | 8   | 19  | 10  | 13  |     | 60.7 | 63.3 | 63.1 | 59.5 |
| 6         | 1   | 3   | 24  | 3   | 3   | 32  | 4   | 6   |     | 83.3 | 89.9 | 86.1 | 83.3 |
| 3         | 6   | 3   | 8   | 13  | 9   | 11  | 19  | 12  |     | 40.3 | 36.7 | 36.6 | 66.7 |
| 12        | 0   | 0   | 17  | 2   | 11  | 27  | 4   | 11  |     | 77.4 | 87.1 | 82.3 | 84.3 |
| 6         | 0   | 6   | 20  | 1   | 9   | 26  | 1   | 13  |     | 79.8 | 96.3 | 88.1 | 81.6 |
| 4         | 2   | 6   | 17  | 3   | 10  | 21  | 6   | 16  |     | 69.0 | 80.8 | 74.5 | 69.6 |
| 2         | 2   | 8   | 6   | 1   | 23  | 9   | 3   | 31  |     | 55.9 | 71.7 | 64.3 | 59.3 |





TABLE X A

| Better Judgment<br>to Final Settings | Amount of Difference<br>between adjacent pairs<br>F.E. Value. | Value S.E. plus next<br>lowest value. | Assigned Value<br>as is used in<br>Final results |
|--------------------------------------|---------------------------------------------------------------|---------------------------------------|--------------------------------------------------|
|                                      |                                                               |                                       |                                                  |
| 182                                  | 83.0                                                          | 11.1894                               | 11.2                                             |
| 185                                  | 78.2                                                          | 11.3048                               | 11.3                                             |
| 188                                  | 71.1                                                          | 11.4177                               | 11.4                                             |
| 191                                  | 61.1                                                          | 11.5288                               | 11.5                                             |
| 193                                  | 77.3                                                          | 11.6380                               | 11.6                                             |
| 196                                  | 80.7                                                          | 11.7456                               | 11.7                                             |
| 198                                  | 69.4                                                          | 11.8518                               | 11.8                                             |
| 199                                  | 78.2                                                          | 11.9566                               | 11.9                                             |
| 200                                  | 80.0                                                          | 12.0600                               | 12.0                                             |
| 202                                  | 84.7                                                          | 12.1620                               | 12.1                                             |
| 203                                  | 82.2                                                          | 12.2626                               | 12.2                                             |
| 205                                  | 81.2                                                          | 12.3618                               | 12.3                                             |
| 208                                  | 75.8                                                          | 12.4596                               | 12.4                                             |
| 209                                  | 80.5                                                          | 12.5560                               | 12.5                                             |
| 210                                  | 87.2                                                          | 12.6510                               | 12.6                                             |
| 211                                  | 78.4                                                          | 12.7446                               | 12.7                                             |
| 214                                  | 81.7                                                          | 12.8368                               | 12.8                                             |
| 215                                  | 81.7                                                          | 12.9276                               | 12.9                                             |
| 216                                  |                                                               | 0.                                    | 0.                                               |
| 217                                  | (1)                                                           | (1)                                   | (1)                                              |

TABLE XI A

|     |      |         |      |
|-----|------|---------|------|
| 218 | 88.2 | 12.2231 | 12.2 |
| 219 | 71.7 | 12.3110 | 12.3 |
| 220 | 80.0 | 12.3960 | 12.4 |
| 221 | 72.2 | 12.4780 | 12.5 |
| 222 | 78.0 | 12.5570 | 12.6 |
| 223 | 82.0 | 12.6330 | 12.7 |
| 224 | 74.2 | 12.7060 | 12.8 |
| 225 | 76.2 | 12.7760 | 12.9 |
| 226 | 76.2 | 12.8430 | 13.0 |
| 227 | 82.2 | 12.9080 | 13.1 |
| 228 | 82.2 | 12.9710 | 13.2 |
| 229 | 72.0 | 13.0320 | 13.3 |
| 230 | 82.2 | 13.0910 | 13.4 |
| 231 | 82.2 | 13.1480 | 13.5 |
| 232 | 82.2 | 13.2030 | 13.6 |
| 233 | 82.2 | 13.2560 | 13.7 |
| 234 | 82.2 | 13.3070 | 13.8 |
| 235 | 82.2 | 13.3560 | 13.9 |
| 236 | 82.2 | 13.4030 | 14.0 |
| 237 | 82.2 | 13.4480 | 14.1 |
| 238 | 82.2 | 13.4910 | 14.2 |
| 239 | 82.2 | 13.5320 | 14.3 |
| 240 | 82.2 | 13.5710 | 14.4 |
| 241 | 82.2 | 13.6080 | 14.5 |
| 242 | 82.2 | 13.6430 | 14.6 |
| 243 | 82.2 | 13.6760 | 14.7 |
| 244 | 82.2 | 13.7070 | 14.8 |
| 245 | 82.2 | 13.7360 | 14.9 |
| 246 | 82.2 | 13.7630 | 15.0 |
| 247 | 82.2 | 13.7880 | 15.1 |
| 248 | 82.2 | 13.8110 | 15.2 |
| 249 | 82.2 | 13.8320 | 15.3 |
| 250 | 82.2 | 13.8510 | 15.4 |
| 251 | 82.2 | 13.8680 | 15.5 |
| 252 | 82.2 | 13.8830 | 15.6 |
| 253 | 82.2 | 13.8960 | 15.7 |
| 254 | 82.2 | 13.9070 | 15.8 |
| 255 | 82.2 | 13.9160 | 15.9 |
| 256 | 82.2 | 13.9230 | 16.0 |
| 257 | 82.2 | 13.9280 | 16.1 |
| 258 | 82.2 | 13.9310 | 16.2 |
| 259 | 82.2 | 13.9320 | 16.3 |
| 260 | 82.2 | 13.9310 | 16.4 |
| 261 | 82.2 | 13.9280 | 16.5 |
| 262 | 82.2 | 13.9230 | 16.6 |
| 263 | 82.2 | 13.9160 | 16.7 |
| 264 | 82.2 | 13.9070 | 16.8 |
| 265 | 82.2 | 13.8960 | 16.9 |
| 266 | 82.2 | 13.8830 | 17.0 |
| 267 | 82.2 | 13.8680 | 17.1 |
| 268 | 82.2 | 13.8510 | 17.2 |
| 269 | 82.2 | 13.8320 | 17.3 |
| 270 | 82.2 | 13.8110 | 17.4 |
| 271 | 82.2 | 13.7880 | 17.5 |
| 272 | 82.2 | 13.7630 | 17.6 |
| 273 | 82.2 | 13.7360 | 17.7 |
| 274 | 82.2 | 13.7070 | 17.8 |
| 275 | 82.2 | 13.6760 | 17.9 |
| 276 | 82.2 | 13.6430 | 18.0 |
| 277 | 82.2 | 13.6080 | 18.1 |
| 278 | 82.2 | 13.5710 | 18.2 |
| 279 | 82.2 | 13.5320 | 18.3 |
| 280 | 82.2 | 13.4910 | 18.4 |
| 281 | 82.2 | 13.4480 | 18.5 |
| 282 | 82.2 | 13.4030 | 18.6 |
| 283 | 82.2 | 13.3560 | 18.7 |
| 284 | 82.2 | 13.3070 | 18.8 |
| 285 | 82.2 | 13.2560 | 18.9 |
| 286 | 82.2 | 13.2030 | 19.0 |
| 287 | 82.2 | 13.1480 | 19.1 |
| 288 | 82.2 | 13.0910 | 19.2 |
| 289 | 82.2 | 13.0320 | 19.3 |
| 290 | 82.2 | 12.9710 | 19.4 |
| 291 | 82.2 | 12.9080 | 19.5 |
| 292 | 82.2 | 12.8430 | 19.6 |
| 293 | 82.2 | 12.7760 | 19.7 |
| 294 | 82.2 | 12.7060 | 19.8 |
| 295 | 82.2 | 12.6330 | 19.9 |
| 296 | 82.2 | 12.5570 | 20.0 |
| 297 | 82.2 | 12.4780 | 20.1 |
| 298 | 82.2 | 12.3960 | 20.2 |
| 299 | 82.2 | 12.3110 | 20.3 |
| 300 | 82.2 | 12.2231 | 20.4 |
| 301 | 82.2 | 12.1310 | 20.5 |
| 302 | 82.2 | 12.0360 | 20.6 |
| 303 | 82.2 | 11.9380 | 20.7 |
| 304 | 82.2 | 11.8360 | 20.8 |
| 305 | 82.2 | 11.7310 | 20.9 |
| 306 | 82.2 | 11.6230 | 21.0 |
| 307 | 82.2 | 11.5110 | 21.1 |
| 308 | 82.2 | 11.3960 | 21.2 |
| 309 | 82.2 | 11.2780 | 21.3 |
| 310 | 82.2 | 11.1570 | 21.4 |
| 311 | 82.2 | 11.0330 | 21.5 |
| 312 | 82.2 | 10.9060 | 21.6 |
| 313 | 82.2 | 10.7760 | 21.7 |
| 314 | 82.2 | 10.6430 | 21.8 |
| 315 | 82.2 | 10.5070 | 21.9 |
| 316 | 82.2 | 10.3680 | 22.0 |
| 317 | 82.2 | 10.2260 | 22.1 |
| 318 | 82.2 | 10.0810 | 22.2 |
| 319 | 82.2 | 9.9330  | 22.3 |
| 320 | 82.2 | 9.7820  | 22.4 |
| 321 | 82.2 | 9.6280  | 22.5 |
| 322 | 82.2 | 9.4710  | 22.6 |
| 323 | 82.2 | 9.3110  | 22.7 |
| 324 | 82.2 | 9.1480  | 22.8 |
| 325 | 82.2 | 8.9820  | 22.9 |
| 326 | 82.2 | 8.8130  | 23.0 |
| 327 | 82.2 | 8.6410  | 23.1 |
| 328 | 82.2 | 8.4660  | 23.2 |
| 329 | 82.2 | 8.2880  | 23.3 |
| 330 | 82.2 | 8.1070  | 23.4 |
| 331 | 82.2 | 7.9230  | 23.5 |
| 332 | 82.2 | 7.7360  | 23.6 |
| 333 | 82.2 | 7.5460  | 23.7 |
| 334 | 82.2 | 7.3530  | 23.8 |
| 335 | 82.2 | 7.1570  | 23.9 |
| 336 | 82.2 | 6.9580  | 24.0 |
| 337 | 82.2 | 6.7560  | 24.1 |
| 338 | 82.2 | 6.5510  | 24.2 |
| 339 | 82.2 | 6.3430  | 24.3 |
| 340 | 82.2 | 6.1320  | 24.4 |
| 341 | 82.2 | 5.9180  | 24.5 |
| 342 | 82.2 | 5.7010  | 24.6 |
| 343 | 82.2 | 5.4810  | 24.7 |
| 344 | 82.2 | 5.2580  | 24.8 |
| 345 | 82.2 | 5.0320  | 24.9 |
| 346 | 82.2 | 4.8030  | 25.0 |
| 347 | 82.2 | 4.5710  | 25.1 |
| 348 | 82.2 | 4.3360  | 25.2 |
| 349 | 82.2 | 4.0980  | 25.3 |
| 350 | 82.2 | 3.8570  | 25.4 |
| 351 | 82.2 | 3.6130  | 25.5 |
| 352 | 82.2 | 3.3660  | 25.6 |
| 353 | 82.2 | 3.1160  | 25.7 |
| 354 | 82.2 | 2.8630  | 25.8 |
| 355 | 82.2 | 2.6070  | 25.9 |
| 356 | 82.2 | 2.3480  | 26.0 |
| 357 | 82.2 | 2.0860  | 26.1 |
| 358 | 82.2 | 1.8210  | 26.2 |
| 359 | 82.2 | 1.5530  | 26.3 |
| 360 | 82.2 | 1.2820  | 26.4 |
| 361 | 82.2 | 1.0080  | 26.5 |
| 362 | 82.2 | 0.7310  | 26.6 |
| 363 | 82.2 | 0.4510  | 26.7 |
| 364 | 82.2 | 0.1680  | 26.8 |
| 365 | 82.2 | 0.      | 26.9 |
| 366 | 82.2 | 0.      | 27.0 |

| Comparisons. | Value 12 | Value 13 |
|--------------|----------|----------|
|              |          |          |
| 1071         | 80.7     | 11.4     |
| 1072         | 84.2     | 11.0     |
| 1073         | 84.2     | 10.45    |
| 1074         | 84.2     | 10.1     |
| 1075         | 84.2     | 9.55     |
| 1076         | 84.2     | 8.95     |
| 1077         | 84.2     | 8.35     |
| 1078         | 84.2     | 7.75     |
| 1079         | 84.2     | 7.15     |
| 1080         | 84.2     | 6.55     |
| 1081         | 84.2     | 5.95     |
| 1082         | 84.2     | 5.35     |
| 1083         | 84.2     | 4.75     |
| 1084         | 84.2     | 4.15     |
| 1085         | 84.2     | 3.55     |
| 1086         | 84.2     | 2.95     |
| 1087         | 84.2     | 2.35     |
| 1088         | 84.2     | 1.75     |
| 1089         | 84.2     | 1.15     |
| 1090         | 84.2     | 0.55     |
| 1091         | 84.2     | 0.       |
| 1092         | 84.2     | 0.       |
| 1093         | 84.2     | 0.       |
| 1094         | 84.2     | 0.       |
| 1095         | 84.2     | 0.       |
| 1096         | 84.2     | 0.       |
| 1097         | 84.2     | 0.       |
| 1098         | 84.2     | 0.       |
| 1099         | 84.2     | 0.       |
| 1100         | 84.2     | 0.       |
| 1101         | 84.2     | 0.       |
| 1102         | 84.2     | 0.       |
| 1103         | 84.2     | 0.       |
| 1104         | 84.2     | 0.       |
| 1105         | 84.2     | 0.       |
| 1106         | 84.2     | 0.       |
| 1107         | 84.2     | 0.       |
| 1108         | 84.2     | 0.       |
| 1109         | 84.2     | 0.       |
| 1110         | 84.2     | 0.       |
| 1111         | 84.2     | 0.       |
| 1112         | 84.2     | 0.       |
| 1113         | 84.2     | 0.       |
| 1114         | 84.2     | 0.       |
| 1115         | 84.2     | 0.       |
| 1116         | 84.2     | 0.       |
| 1117         | 84.2     | 0.       |
| 1118         | 84.2     | 0.       |
| 1119         | 84.2     | 0.       |
| 1120         | 84.2     | 0.       |
| 1121         | 84.2     | 0.       |
| 1122         | 84.2     | 0.       |
| 1123         | 84.2     | 0.       |
| 1124         | 84.2     | 0.       |
| 1125         | 84.2     | 0.       |
| 1126         | 84.2     | 0.       |
| 1127         | 84.2     | 0.       |
| 1128         | 84.2     | 0.       |
| 1129         | 84.2     | 0.       |
| 1130         | 84.2     | 0.       |
| 1131         | 84.2     | 0.       |
| 1132         | 84.2     | 0.       |
| 1133         | 84.2     | 0.       |
| 1134         | 84.2     | 0.       |
| 1135         | 84.2     | 0.       |
| 1136         | 84.2     | 0.       |
| 1137         | 84.2     | 0.       |
| 1138         | 84.2     | 0.       |
| 1139         | 84.2     | 0.       |
| 1140         | 84.2     | 0.       |
| 1141         | 84.2     | 0.       |
| 1142         | 84.2     | 0.       |
| 1143         | 84.2     | 0.       |
| 1144         | 84.2     | 0.       |
| 1145         | 84.2     | 0.       |
| 1146         | 84.2     | 0.       |
| 1147         | 84.2     | 0.       |
| 1148         | 84.2     | 0.       |
| 1149         | 84.2     | 0.       |
| 1150         | 84.2     | 0.       |
| 1151         | 84.2     | 0.       |
| 1152         | 84.2     | 0.       |
| 1153         | 84.2     | 0.       |
| 1154         | 84.2     | 0.       |
| 1155         | 84.2     | 0.       |
| 1156         | 84.2     | 0.       |
| 1157         | 84.2     | 0.       |
| 1158         | 84.2     | 0.       |
| 1159         | 84.2     | 0.       |
| 1160         | 84.2     | 0.       |
| 1161         | 84.2     | 0.       |
| 1162         | 84.2     | 0.       |
| 1163         | 84.2     | 0.       |
| 1164         | 84.2     | 0.       |
| 1165         | 84.2     | 0.       |
| 1166         | 84.2     | 0.       |
| 1167         | 84.2     | 0.       |
| 1168         | 84.2     | 0.       |
| 1169         | 84.2     | 0.       |
| 1170         | 84.2     | 0.       |
| 1171         | 84.2     | 0.       |
| 1172         | 84.2     | 0.       |
| 1173         | 84.2     | 0.       |
| 1174         | 84.2     | 0.       |
| 1175         | 84.2     | 0.       |
| 1176         | 84.2     | 0.       |
| 1177         | 84.2     | 0.       |
| 1178         | 84.2     | 0.       |
| 1179         | 84.2     | 0.       |
| 1180         | 84.2     | 0.       |
| 1181         | 84.2     | 0.       |
| 1182         | 84.2     | 0.       |
| 1183         | 84.2     | 0.       |
| 1184         | 84.2     | 0.       |
| 1185         | 84.2     | 0.       |
| 1186         | 84.2     | 0.       |
| 1187         | 84.2     | 0.       |
| 1188         | 84.2     | 0.       |
| 1189         | 84.2     | 0.       |
| 1190         | 84.2     | 0.       |
| 1191         | 84.2     | 0.       |
| 1192         | 84.2     | 0.       |
| 1193         | 84.2     | 0.       |
| 1194         | 84.2     | 0.       |
| 1195         | 84.2     | 0.       |
| 1196         | 84.2     | 0.       |
| 1197         | 84.2     | 0.       |
| 1198         | 84.2     | 0.       |
| 1199         | 84.2     | 0.       |
| 1200         | 84.2     | 0.       |





**FOLD OUT**



**FOLD OUT**





Figure IV A.



401 Value 188



584 Value 186



506



511 Value 182



516 Value 177



# Figure IV. A. Cui



303 Value 15.5



915 Value 21



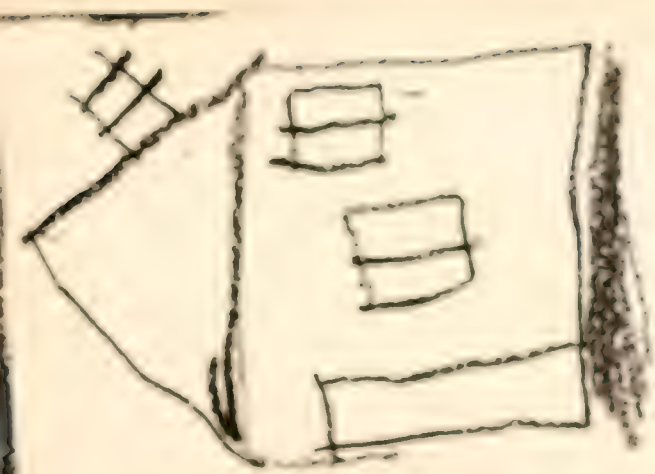
60 Value 19.7



11 Value 18.8



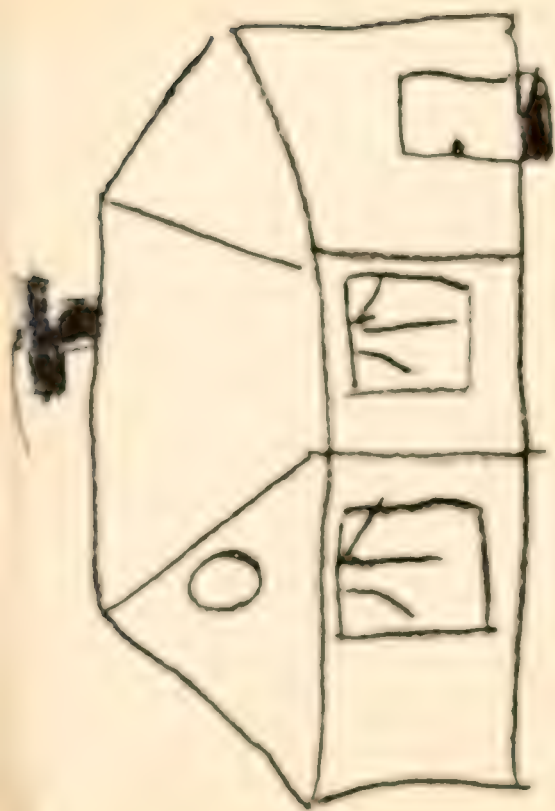




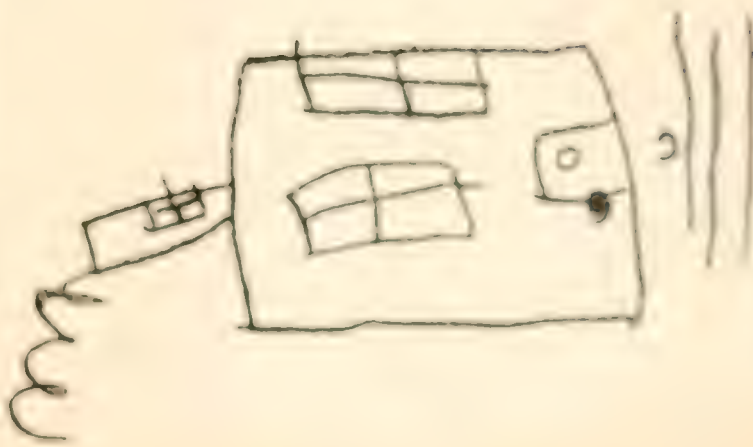
1940 Value 15



1940 Value 15



1940 Value 15



1940 Value 15





1358 Value 203



1359 Value 177



1360 Value 221



1361 Value 175







Fig. 1. (a) and (b)

Fig. 2. (a) and (b)

These are the only two drawings of the same scene. The other two drawings are of different scenes.





### III. The Application of the Scales-

Three measuring instruments were now available for further study of the drawings. The next problem was the application of the scales to the material at hand. Several motives prompted this step. A study of the distribution of scores would give some indication of the reliability of the measures themselves. Comparisons could be made to discover differences of achievement with age, sex, grade, and school system.

The drawings had been previously classified for the three subjects of the scales. The three sets were now subjected to careful rating by the scales. Three judges rated each drawing, the chairman and two assistants. These assistants were first instructed in the use of the scales. Each rated a considerable number of drawings under supervision and criticism. Then the final evaluation was undertaken. Each judge determined upon her rating independently, and recorded it on the back of the drawing. After the three ratings had been made, their average value was taken as the final score of the specimen.

In this way, all the drawings of the original collection which were comparable with the three scales were measured. In addition, a number of other drawings, which had later come into our hands, were evaluated for the four and eight year groups.

The results of this step for each subject are presented in the form of a general summary of the distributions for each of the grades, and for the whole group, by ages and sexes, in tables XIII, XIV, and XV. The facts of the final summary combining the three grades are shown graphically in Figures I, II, and III.

It is evident that there is in each subject a steady rise in the median score from year to year, except that in the case of houses and human beings there is a slight drop at 8 years, six months. This may be accounted for either as a chance deviation from the normal tendency, due to a small number of cases, or, quite as probably, as a true deviation, due to the mentally retarded character of the older children.

In the range of distribution, there is enormous overlapping from year to year, so that the most gifted four year old children reach or exceed the median for eight year old children, and, vice versa, the least gifted of the eight year group only approximate the median for the youngest kindergarten children, but in every case either the lower end of the curve for any younger group is below the lower end of the curve for the next higher group or the frequency for the lowest scores is greater for the younger children. Also the upper end of the curve for the older group is nearly always above the upper end of the curve for the next lower group. No eight year child draws as poorly as the poorest four year old, and no four year old child draws as well as the best eight year old child.

The grade differences are also significant. Briefly, these are the facts :



**FOLD OUT**





House

Score

Kindergarten

**FOLD OUT**



Figure 22

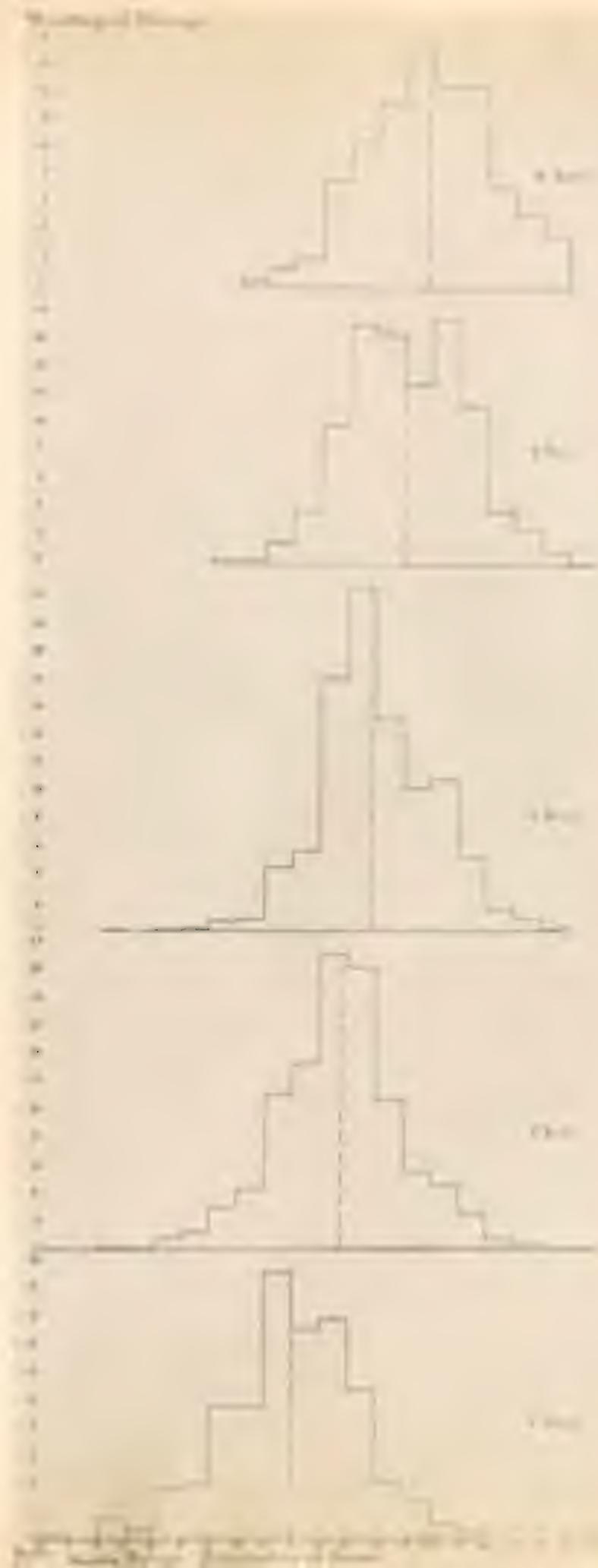




Figure VIII

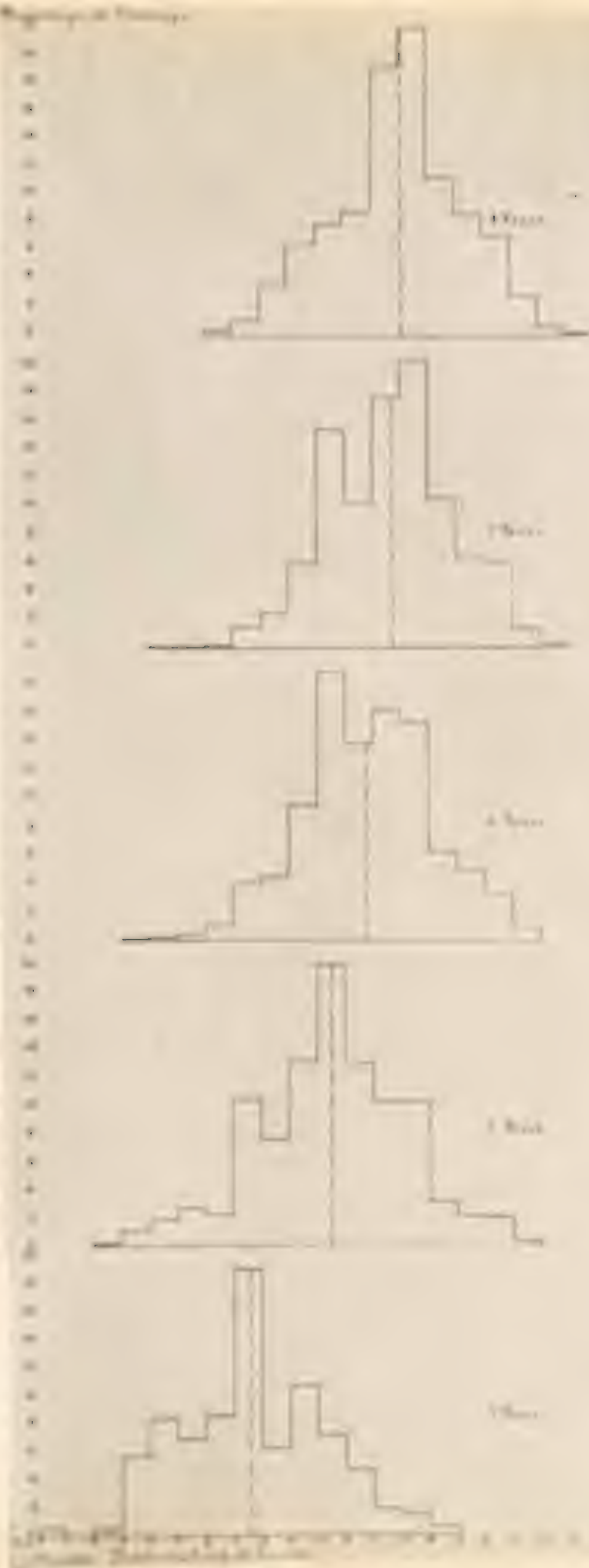






Figure IX

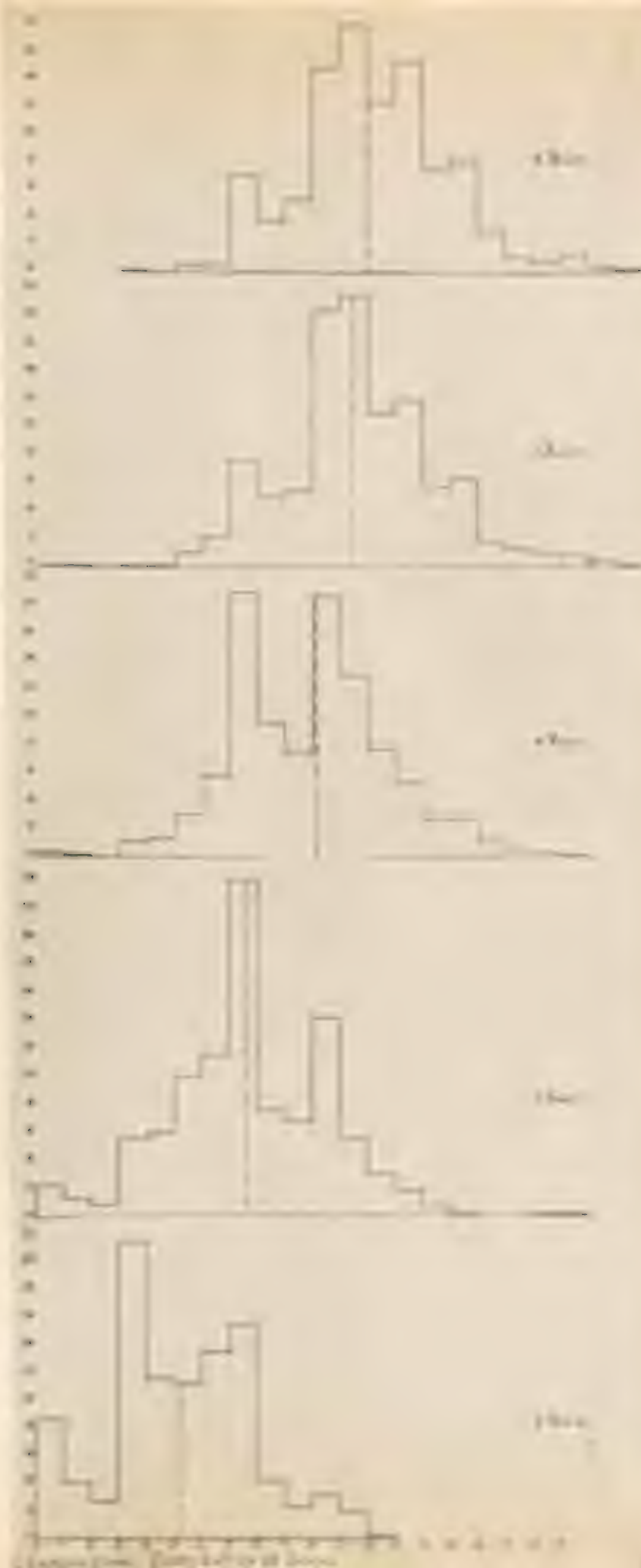




Table XVI

| PERSONS      | 4 Years | 5 Years | 6 Years | 7 Years | 8 Years |
|--------------|---------|---------|---------|---------|---------|
| Kindergarten | 8.0     | 10.7    | 11.4    | 12.0    |         |
| First Grade  |         | 11.8    | 11.9    | 12.8    | 13.4    |
| Second Grade |         |         | 12.1    | 12.8    | 14.4    |
| HOUSES       |         |         |         |         |         |
| Kindergarten | 7.8     | 10.6    | 11.1    | 12.4    |         |
| First Grade  |         | 11.8    | 11.9    | 12.4    | 13.4    |
| Second Grade |         |         | 11.8    | 12.1    | 13.8    |
| COMPOSITIONS |         |         |         |         |         |
| Kindergarten | 8.0     | 9.8     | 9.7     | 11.9    |         |
| First Grade  |         | 9.7     | 10.3    | 10.7    | 10.8    |
| Second Grade |         |         | 11.7    | 11.9    | 12.4    |

Medians for ages and grades for the three forms.

Two general tendencies are evident. Comparing first the medians

for the several ages within each grade (reading across the page), with one exception, we find consistent progress from year to year. Chronological maturity apparently brings fairly constant improvement in drawing ability, irrespective of school progress.

Looking next at the medians for the three grades (reading down the page) we find that with two exceptions there is definite increase in the score from grade to grade. (In the two exceptional groups the number of cases, 50 and 30 respectively, is relatively small). The five and six year old children in first grade rank higher than those in the kindergarten. The six year old children in the second grade rank higher than those in the first, etc.

Several explanations might be offered. It may be that those pupils who have advanced to higher classes, having been exposed to the stimulus of mature children, have profited by their responses. It may be that the instruction in drawing improves from grade to grade, though this may be seriously doubted. Finally, it may be that acceleration in school progress and ability to draw are both the result of a common cause—superior "general intelligence" or to a group of correlated causes. Further evidence will be presented on this point. It is possible that all three factors are operative.





Certain sex differences appear. According to the median scores, boys and girls are nearly equal in the quality of their representations of houses, with a slight advantage (.1%) in the total score in favor of the girls. Girls draw the human figure considerably better than boys (.7% for the combined median for all the groups). This superiority, while not great, is consistent through all the years of all the grades. On the other hand, boys excel in the drawing of compositions (.5% for the combined median) except in the Kindergarten group, when the combined median for the several ages is .3% higher for the girls. Even here, the boys equal the girls at five, and in the 6-8 and seven year groups. The data suggest that girls are more interested and therefore excel in the representation of detail, of single objects, whereas boys are more interested and therefore excel in the representation of objects in relation to one another.

Since the age-grade distribution of the drawings varies considerably, no valid comparison of the records for the cities represented could be made with the data in their original form. As the most convenient measure of the differences due to geographical distribution - and, probably, to the quality of instruction as well - the percentage of children in each city reaching or exceeding the median for all children of their respective ages was calculated. For example, for city A, the number of drawings of persons by four year old children which were equal to, or better than, the median rating for four year old children in general, was counted. This sum was then converted into a percentile value, based on the total number of drawings of persons by four year old children in city A. The same was done for all years and for the three subjects. The grade scores were kept separate, but the age scores within each grade were combined to form the total score for that grade. This provides a rough measure of the difference in drawing achievement from grade to grade within each city and from city to city. The figures are given in Tables IVII, IVIII, and III. (For obvious reasons, the symbols for the cities have been arbitrarily assigned.)

Each table gives first the number of drawings of the subject in question, first by grades and then as a total. This represents the number of cases on which the percentages are based. Since the total amount of material sent by the cities differed considerably, and the number of drawings for each subject depended upon the choice of the individual children, there is a wide variation in the number of drawings for each city and for each subject. The reliability of the score of any city depends upon the number of drawings included in it. Obviously a score based on 8, or even 30 drawings has no dependable value for that city, while a score based upon a hundred or more random samplings should have considerable reliability.

There is manifestly a wide deviation in the ratings of the various cities. The percentages reaching or exceeding the median range from 21.0 to 88.3. The final composite scores (Table III) which give the average achievement for the 3 forms for all grades and ages, range from 71.5 to 83.7. There is also a fair degree of uniformity in the position of each city for the several measures. In eight of the twenty-seven cities all the scores are grouped consistently either above or below the median. Five others have all but one of their scores on the same side of the median line. Some of the facts are presented graphically in Figures I and II. In these, only those cities, 19 in all, are



TABLE XYZ

| Number of<br>Drawings.<br>Number of<br>Drawings. | First<br>Grade | Second<br>Grade | Total | Percent Drawing<br>or Travelling, Miles.<br>Percentage. | First<br>Grade | Second<br>Grade | Total |
|--------------------------------------------------|----------------|-----------------|-------|---------------------------------------------------------|----------------|-----------------|-------|
| 111                                              | 100            | 170             | 270   | 44.7                                                    | 81.3           | 88.7            | 170.0 |
| 112                                              | 70             | 41              | 111   | 44.7                                                    | 49.7           | 41.3            | 91.0  |
| 113                                              |                |                 | 174   | 47.3                                                    |                |                 |       |
| 114                                              | 100            | 80              | 180   | 47.3                                                    | 83.3           | 96.7            | 180.0 |
| 115                                              | 100            | 80              | 180   | 48.1                                                    | 84.1           | 95.9            | 180.0 |
| 116                                              | 41             | 20              | 61    | 48.1                                                    | 41.1           | 20.0            | 61.1  |
| 117                                              |                |                 | 44    | 48.1                                                    |                |                 |       |
| 118                                              | 100            | 110             | 210   | 48.6                                                    | 83.3           | 126.7           | 210.0 |
| 119                                              | 70             | 30              | 100   | 48.6                                                    | 50.0           | 50.0            | 100.0 |
| 120                                              | 61             | 30              | 91    | 47.1                                                    | 47.1           | 43.9            | 91.0  |
| 121                                              |                | 2               | 2     | 51.8                                                    |                | 22.2            | 22.2  |
| 122                                              | 100            | 114             | 214   | 71.7                                                    | 50.0           | 64.1            | 114.1 |
| 123                                              | 70             | 30              | 100   | 47.3                                                    | 40.0           | 40.0            | 80.0  |
| 124                                              | 30             | 10              | 40    | 40.0                                                    | 30.0           | 10.0            | 40.0  |
| 125                                              | 80             | 10              | 90    | 44.1                                                    | 40.0           | 11.1            | 51.1  |
| 126                                              | 43             | 5               | 48    | 41.3                                                    | 27.3           | 20.7            | 48.0  |
| 127                                              | 63             | 17              | 80    | 62.8                                                    | 60.1           | 19.9            | 80.0  |
| 128                                              | 42             | 10              | 52    | 62.2                                                    | 40.0           | 12.2            | 52.2  |
| 129                                              | 117            | 72              | 189   | 64.3                                                    | 50.0           | 71.4            | 121.4 |
| 130                                              |                |                 | 36    | 60.4                                                    |                |                 |       |
| 131                                              | 100            | 61              | 161   | 50.4                                                    | 44.1           | 42.9            | 87.0  |
| 132                                              | 22             | 22              | 44    | 40.3                                                    | 20.0           | 20.0            | 40.0  |
| 133                                              |                |                 | 100   | 52.3                                                    |                |                 |       |
| 134                                              | 5              |                 | 5     | 40.0                                                    | 10.0           |                 | 10.0  |
| 135                                              | 11             | 20              | 31    | 60.0                                                    | 40.1           | 37.9            | 78.0  |
| 136                                              | 100            | 70              | 170   | 60.1                                                    | 60.0           | 41.0            | 101.0 |
| 137                                              | 17             |                 | 17    | 77.7                                                    | 70.0           |                 | 70.0  |



| Number of<br>Articles,<br>Hatchery-<br>products | First<br>Grade | Second<br>Grade | Total | Percent Reaching<br>or Exceeding Median<br>Hatchery-<br>products. | First<br>Grade | Second<br>Grade | Total. |
|-------------------------------------------------|----------------|-----------------|-------|-------------------------------------------------------------------|----------------|-----------------|--------|
| 104                                             | 305            | 343             | 648   | 47.5                                                              | 31.1           | 34.3            | 65.4   |
| 105                                             | 34             | 40              | 74    | 41.5                                                              | 27.0           | 36.1            | 63.1   |
| 106                                             |                |                 | 100   | 42.5                                                              |                |                 |        |
| 108                                             | 440            | 144             | 584   | 47.1                                                              | 34.3           | 40.5            | 74.8   |
| 110                                             | 154            | 118             | 272   | 47.0                                                              | 28.7           | 36.4            | 65.1   |
| 111                                             | 174            | 78              | 252   | 50.7                                                              | 33.7           | 36.0            | 69.7   |
| 112                                             |                |                 | 37    | 41.5                                                              |                |                 |        |
| 113                                             | 251            | 112             | 363   | 50.1                                                              | 33.1           | 38.4            | 71.5   |
| 114                                             | 181            | 38              | 219   | 37.0                                                              | 37.4           | 38.8            | 76.2   |
| 115                                             | 114            | 48              | 162   | 42.0                                                              | 32.0           | 40.7            | 72.7   |
| 116                                             |                | 14              | 14    | 45.0                                                              |                | 31.4            | 31.4   |
| 117                                             | 314            | 147             | 461   | 50.0                                                              | 36.3           | 38.0            | 74.3   |
| 118                                             | 35             | 29              | 64    | 41.0                                                              | 41.1           | 44.4            | 85.5   |
| 119                                             | 77             | 31              | 108   | 51.0                                                              | 40.0           | 38.4            | 78.4   |
| 120                                             | 38             | 46              | 84    | 31.0                                                              | 23.2           | 30.7            | 53.9   |
| 121                                             | 28             | 14              | 42    | 30.0                                                              | 28.3           | 37.1            | 65.4   |
| 122                                             | 79             | 25              | 104   | 34.4                                                              | 38.1           | 51.1            | 89.2   |
| 123                                             | 88             | 30              | 118   | 36.0                                                              | 38.3           | 37.7            | 76.0   |
| 124                                             | 273            | 98              | 371   | 35.0                                                              | 35.3           | 40.3            | 75.6   |
| 125                                             |                |                 | 39    | 35.4                                                              |                |                 |        |
| 126                                             | 54             | 38              | 92    | 27.0                                                              | 32.1           | 31.0            | 63.1   |
| 127                                             | 49             | 24              | 73    | 30.0                                                              | 37.3           | 37.3            | 74.6   |
| 128                                             |                |                 | 8     | 33.0                                                              |                |                 |        |
| 129                                             | 18             |                 | 18    | 33.1                                                              | 31.1           |                 | 31.1   |
| 130                                             | 121            | 27              | 148   | 36.0                                                              | 32.4           | 33.3            | 65.7   |
| 131                                             | 573            | 84              | 657   | 46.0                                                              | 34.3           | 36.3            | 70.6   |





TABLE III

| Number of<br>Grains,<br>Hundredweight | First<br>Grade | Second<br>Grade | Total | Percent Good<br>or Gooder Grain<br>Hundredweight | First<br>Grade | Second<br>Grade | Total |
|---------------------------------------|----------------|-----------------|-------|--------------------------------------------------|----------------|-----------------|-------|
| 181                                   | 482            | 478             | 960   | 84.8                                             | 51.2           | 51.8            | 103.0 |
| 182                                   | 78             | 80              | 158   | 87.8                                             | 52.2           | 52.7            | 104.9 |
| 183                                   | 12             | 22              | 34    | 88.2                                             | 72.2           | 72.4            | 144.6 |
| 84                                    | 122            | 82              | 204   | 84.1                                             | 82.2           | 82.5            | 164.7 |
| 87                                    | 80             | 172             | 252   | 85.5                                             | 87.7           | 42.2            | 129.9 |
| 87                                    | 127            | 122             | 249   | 87.5                                             | 87.2           | 87.7            | 174.9 |
| 71                                    |                |                 | 71    | 87.9                                             |                |                 |       |
| 91                                    | 45             | 122             | 167   | 72.2                                             | 54.4           | 55.2            | 109.6 |
| 2                                     | 27             | 42              | 69    | 85.0                                             | 67.6           | 51.2            | 118.8 |
| 4                                     | 82             | 86              | 168   | 100.                                             | 71.0           | 55.5            | 126.5 |
| 22                                    |                | 8               | 30    | 51.8                                             |                | 75.9            |       |
| 122                                   | 172            | 127             | 300   | 83.6                                             | 74.7           | 59.9            | 134.6 |
| 82                                    | 85             | 52              | 137   | 74.2                                             | 80.2           | 41.1            | 121.3 |
| 122                                   | 84             | 102             | 186   | 81.1                                             | 71.5           | 52.5            | 124.0 |
| 22                                    | 27             | 41              | 68    | 45.9                                             | 22.4           | 42.2            | 64.6  |
| 11                                    | 22             | 11              | 33    | 72.2                                             | 52.1           | 22.2            | 74.3  |
| 42                                    | 42             | 42              | 126   | 87.4                                             | 54.2           | 54.2            | 108.4 |
| 12                                    | 122            | 102             | 224   | 85.5                                             | 72.2           | 57.2            | 129.4 |
| 122                                   | 222            | 172             | 394   | 87.2                                             | 50.4           | 45.2            | 95.6  |
| 82                                    |                |                 | 82    | 75.2                                             |                |                 |       |
| 81                                    | 22             | 27              | 49    | 87.2                                             | 54.2           | 55.2            | 109.4 |
| 84                                    | 21             | 11              | 32    | 85.2                                             | 52.1           | 55.4            | 107.5 |
| 82                                    |                |                 | 82    | 85.1                                             |                |                 |       |
| 21                                    | 3              |                 | 24    | 47.2                                             | 52.2           |                 |       |
| 112                                   | 42             | 22              | 64    | 42.1                                             | 71.1           | 44.2            | 115.3 |
| 222                                   | 147            | 42              | 189   | 51.2                                             | 53.2           | 52.2            | 105.4 |
| 20                                    | 21             |                 | 41    | 87.0                                             | 52.2           |                 |       |



TABLE XX A  
Composite - General

| Year | Underparton | First Grade | Second Grade | Total |
|------|-------------|-------------|--------------|-------|
| A    | 42.1        | 41.8        | 40.4         | 41.4  |
| B    | 42.1        | 47.4        | 46.0         | 45.1  |
| C    | 42.1        |             |              |       |
| D    | 48.0        | 44.8        | 44.7         | 45.8  |
| E    | 40.4        | 44.3        | 43.3         | 42.6  |
| F    | 41.1        | 73.7        | 47.3         | 72.3  |
| G    | 40.1        |             |              |       |
| H    | 48.1        | 40.3        | 43.3         | 43.9  |
| I    | 48.0        | 43.4        | 43.4         | 45.9  |
| J    |             | 43.7        | 47.4         |       |
| K    | 43.7        |             | 45.0         |       |
| L    | 77.5        | 47.3        | 46.8         | 46.4  |
| M    | 44.7        | 47.3        | 43.3         | 45.7  |
| N    | 42.7        | 44.7        | 47.3         | 44.9  |
| O    | 40.0        | 40.7        | 40.3         | 40.4  |
| P    | 40.4        | 44.1        | 43.7         | 42.7  |
| Q    | 75.3        | 47.7        | 46.4         | 47.8  |
| R    | 49.3        | 73.7        | 40.3         | 70.3  |
| S    | 47.7        | 40.0        | 47.3         | 45.0  |
| T    | 44.8        |             |              |       |
| U    | 48.3        | 40.3        | 43.3         | 44.7  |
| V    | 47.4        | 51.4        | 49.7         | 52.0  |
| W    | 44.1        |             |              |       |
| X    | 40.3        | 40.1        |              |       |
| Y    | 47.3        | 40.4        | 44.7         | 47.8  |
| Z    | 44.8        | 50.3        | 42.2         | 49.1  |





included for which all the grades and all the subjects are represented. Figure I compares the status of the three grades of these nineteen in one subject - human beings, which was taken as typical. It should be interpreted, in city 1, (first vertical series of dots), 57% of the Kindergarten children, 51 % of the first grade children, and only 43% of the second grade children exceeded the median score for all children in drawing human beings. Figure II compares in the same way the achievements of the same nineteen cities for the three subjects, the total score of the three grades being used. It should be interpreted, in city 1 52% of the children in the three grades who attempted to draw compositions exceeded the medians for all children of their several ages; 54% of those who draw houses exceeded the medians for houses, and 56% of those who draw human beings exceeded the medians for that subject. With few exceptions the three lines connecting the points rise and fall together. This is more evident in Figure XI, a comparison of the ranks for the three forms than in Figure I, a comparison of the three grades. The meaning seems clear: on the whole, those cities which excel in drawing tried to excel in the three grades and in all subjects; and those which are deficient in one subject or grade tended to be deficient in all, because a common cause is at work in each situation.

Comparing the scores by the scales with the factor of richness or poverty of content, mentioned in the previous chapter, it was found that the same cities which drew well, drew from a wide range of experiences, and those which drew poorly showed equal poverty in the ideas they attempted to express. Since these facts relate to many children, located in numbers of schools, it seems fair again to infer that instruction, or lack of instruction in drawing has been responsible for the differences.

It is not assumed that the norms established in this study, and used as a basis for comparison, are true norms. The number of cases in each age group is too limited for such an assumption. Many thousands of drawings should be rated, and their scores combined before any valid norms of achievement could be secured. As tentative standards however, these medians have served their purpose in determining the relative values of the drawings studied. It must also be emphasized that the method of comparison, using the percent reaching or exceeding the median, is at best but a rough measure, since it does not take into account how much the drawings of any city exceed or fall below the median. In fact, if this were considered, the differences between cities would be far greater. The cities varying about the median had many drawings near the median level, whereas those in which there is a high percent above the median had numbers of drawings of a high degree of excellency and those in which the percent reaching the median is low had an equal proportion of markedly inferior work. This is in accordance with the theory of probabilities underlying the normal curve of distribution.

A further application of the scales was made in the study of the small number of drawings by retarded children received from the first and second grades. These were rated in the same manner as the rest. The grades were then compared with the median for eight years, six months, and the percentage of each age reaching or exceeding that median was computed. The results were as follows : -





Comparison of Twenty Cities in Ratings of Human Beings to Three Grades





Figure XI.



Comparison of Twenty Cities in Rating on Three Forms - Averages for Three Grades.





TABLE XI

| AGE   | Over-Aged Children |                                      |                    |                                      |                    |                                      |
|-------|--------------------|--------------------------------------|--------------------|--------------------------------------|--------------------|--------------------------------------|
|       | People             |                                      | Houses             |                                      | Compositions       |                                      |
|       | Number of Drawings | Percent Reaching or Exceeding Median | Number of Drawings | Percent Reaching or Exceeding Median | Number of Drawings | Percent Reaching or Exceeding Median |
| 8-0   | 59                 | 49.2                                 | 107                | 46.8                                 | 85                 | 54.9                                 |
| 9-6   | 21                 | 76.2                                 |                    |                                      | 52                 | 51.9                                 |
| 10-0  | 22                 | 66.3                                 | 67                 | 40.1                                 | 31                 | 48.4                                 |
| 10-6  | 7                  | 57.1                                 |                    |                                      | 9                  | 55.5                                 |
| 11-0  | 4                  | 75.0                                 | 19                 | 36.8                                 | 12                 | 66.7                                 |
| 11-6  | 4                  | 75.0                                 |                    |                                      | 4                  | 58.7                                 |
| 12-0  | 1                  | 0.0                                  | 12                 | 41.6                                 | 8                  | 30.0                                 |
| 12-6  | 2                  | 50.0                                 |                    |                                      | 2                  | 0.0                                  |
| 13-0  | 1                  | 100.0                                | 6                  | 60.0                                 | 5                  | 0.0                                  |
| 13-6  |                    |                                      |                    |                                      |                    |                                      |
| 14-0  |                    |                                      | 1                  | 0.0                                  | 2                  | 0.0                                  |
| 14-6  | 1                  | 100.0                                |                    |                                      |                    |                                      |
| 15-0  |                    |                                      | 2                  | 50.0                                 |                    |                                      |
| 15-6  |                    |                                      |                    |                                      |                    |                                      |
| 16-0  | 1                  | 100.0                                |                    |                                      |                    |                                      |
| 16-6  |                    |                                      |                    |                                      |                    |                                      |
| TOTAL |                    |                                      | 302                | 47.0                                 |                    |                                      |

Percent of over-age children reaching or exceeding the median for 8 years, 6 months in drawing the three subjects.



The numbers are too small for safe inference. They are presented as suggestive of possibilities for future study. For the nine and ten year groups it seems significant that, with the exception of drawings of the human figure they fall considerably below the norms with which they compared. Since these norms are for younger children, is probable that the retarded children are quite inferior in drawing ability to normal children of their own ages.

Two cities having large foreign populations had the nationality of the young artist recorded along with the other information on the back of the drawing. Again the numbers are too limited for any conclusions to be drawn, but they are presented as suggestive for further investigation :

TABLE XII

| NATIONALITY | Foreigners            |                                                 |                       |                                                 |                       |                                                 |
|-------------|-----------------------|-------------------------------------------------|-----------------------|-------------------------------------------------|-----------------------|-------------------------------------------------|
|             | People                |                                                 | Houses                |                                                 | Compositions          |                                                 |
|             | Number of<br>Drawings | Percent<br>Reaching<br>or Exceed-<br>ing Median | Number of<br>Drawings | Percent<br>Reaching<br>or Exceed-<br>ing Median | Number of<br>Drawings | Percent<br>Reaching<br>or Exceed-<br>ing Median |
| CHINESE     | 3                     | 66.7                                            | 18                    | 44.4                                            | 9                     | 33.3                                            |
| ENGLISH     | 8                     | 50.0                                            | 24                    | 29.1                                            | 7                     | 57.1                                            |
| FRANCE      |                       |                                                 |                       |                                                 | 4                     | 100.0                                           |
| GERMAN      | 11                    | 54.6                                            | 19                    | 47.3                                            | 7                     | 57.1                                            |
| HAWAIIAN    |                       |                                                 |                       |                                                 | 5                     | 40.0                                            |
| ITALIAN     | 16                    | 18.8                                            | 16                    | 37.5                                            | 21                    | 42.9                                            |
| JAPANESE    | 12                    | 50.0                                            | 22                    | 77.3                                            | 30                    | 80.0                                            |
| MEXICAN     | 27                    | 59.3                                            | 63                    | 55.5                                            | 42                    | 50.0                                            |
| NEGROES     | 36                    | 42.9                                            | 34                    | 26.4                                            | 40                    | 47.5                                            |
| POLISH      | 19                    | 50.0                                            | 80                    | 33.8                                            | 24                    | 58.3                                            |
| PORTUGUESE  |                       |                                                 |                       |                                                 | 3                     | 33.3                                            |
| RUSSIAN     | 17                    | 47.1                                            | 48                    | 60.4                                            | 45                    | 55.6                                            |
| SPANISH     |                       |                                                 |                       |                                                 | 10                    | 70.0                                            |

Percent of foreign children reaching or exceeding the median for their respective ages in drawing the three subjects.





one of the problems of major interest in these undarkling  
 was study was the relation of drawing ability to intelligence.  
 Some previous investigators have given evidence of this same interest,  
 but no definite measurements, so far as is known, have been made. Iay<sup>1</sup>  
 states that in an experiment in drawing and coloring which he conducted  
 five children of low rank showed surprising independence in this new  
 field. Korssakowsky<sup>2</sup> states that graphic skill generally goes with  
 intellectual ability, but the converse is not necessarily true. Famil-  
 iarity with drawing does not go with ability in drawing. The best draw-  
 ing, however, comes from children making the best school reports. The  
 greatest artists have also been great thinkers. Nevertheless, superior  
 drawing frequently comes from children of the socially inferior classes -  
 from the families of cabinet-makers and other hand workers, rather than  
 from the wealthy and upper classes.

Hall<sup>3</sup> quotes from Ivanoff that there is a positive correlation  
 between drawing and intelligence, and that this correlation is higher  
 with girls than with boys. If a girl draws well she is more likely to  
 be a good scholar than is the boy of like ability. Good drawers usually  
 do well in history and geography, both of which involve visual memory.  
 Arithmetic is less closely related, but more commonly with girls than  
 with boys. Drawing is more closely related to mental cultivation than  
 to any language studies. Defects in drawing however are attributed by  
 Ivanoff chiefly to mental causes - sensory defects, weak mental content,  
 an optic image incapable of guiding the hand, lack of attentive power,  
 etc. Some of these writers gives the data on which his conclusions  
 are based.

In order that definite measurements might be made, it was deter-  
 mined to secure drawings from considerable number of children whose in-  
 telligence had been measured by a standardized test. For this purpose  
 the latest Stanford Revision of the Binet-Simon test was selected, as  
 the best standardized and most widely used measure for kindergarten, pri-  
 mary children. Since it was not practicable for the Committee to con-  
 duct these tests with anything like an adequate number of subjects, an  
 appeal was made to a number of schools and school systems where the tests  
 had been given under satisfactory conditions. From public or private  
 schools at Baltimore, Boston, Chicago, Cincinnati, Denver, Detroit, Grand  
 Rapids, New York City, Richmond, Richmond, Va., and Springfield some favor-  
 able responses. Directions were then sent to the teachers for securing a  
 series of three drawings - one of each subject of the scales - from every  
 child. In this case the subject of the drawing was to be imposed, but the  
 mode of representation was to be left as free as possible.

On every drawing was to be recorded the age and sex of the child,  
 and his intelligence quotient. The results of the drawings all of those  
 for which the data was complete were subjected to the same process of

1. Iay - The Gifted Child and Her Education.

2. Korssakowsky - Die Beziehungen der Intelligenz zum Zeichnen.

3. Hall - Educational Psychology, Vol. II, p. 211.



evaluation as the earlier specimens. They were rated by the three judges, and the average rating for each drawing was determined. Next, the average for the three drawings was computed. Finally, this was converted into a "drawing quotient", by dividing it by the average of the three medians for the age group to which the child belonged. The method is not so refined as the usual achievement quotient, because the medians used were determined for six months periods, whereas the usual method is based upon smaller chronological intervals; moreover, the achievement quotient is usually computed as the ratio of the chronological age to the age value assigned to the product that is being rated. For our purposes, the cruder method seemed justifiable since it gave a result varying directly with the ratio of the child's achievement to that of his age group, and one which was comparable to the intelligence quotient, in that it remained constant from year to year.

The "drawing quotient" having thus<sup>been</sup> determined for each set of 3 drawings, its correlation with the intelligence quotient was calculated by the Pearson formula:

$$r = \frac{\sum A \cdot B - \frac{\sum A \cdot \sum B}{N}}{\sqrt{\left(\sum A^2 - \frac{(\sum A)^2}{N}\right) \left(\sum B^2 - \frac{(\sum B)^2}{N}\right)}}$$

The computations were made first for each half year interval, and then for the group as a whole. Table XIII gives the results.

TABLE XIII

| AGE   | NUMBER OF CASES | CORRICIENT<br>CORRELATION | P. N. |
|-------|-----------------|---------------------------|-------|
| 4-0   | 47              | .108                      | .1871 |
| 4-6   |                 |                           |       |
| 5-0   | 182             | .344                      | .0400 |
| 5-6   | 172             | .344                      | .0376 |
| 6-0   | 208             | .325                      | .0230 |
| 6-6   | 214             | .453                      | .0366 |
| 7-0   | 220             | .348                      | .0311 |
| 7-6   | 107             | .082                      | .0445 |
| 8-0   | 78              | .356                      | .0402 |
| 8-6   | 27              | .372                      | .0871 |
| TOTAL | 1453            | .355                      | .0117 |

Coefficients of Correlation between Drawing Ability and  
General Intelligence, as Measured by the Binet-Simon Test





~~Coefficients of correlation between drawing ability and general intelligence as measured by the Stanford-Binet test of the Binet-Simon test.~~ Considering first the coefficient for the total number of drawings, it is evident that there is a positive relationship between drawing achievement and intelligence, but the degree of relationship is not high. According to the P. E., the reliability of this correlation - the probability that it would generally hold true of random samplings of drawings - is considerable. On the basis of this value solely, it might be assumed that ability in drawing and general intelligence will accompany each other somewhat frequently. Children above the average in one will deviate in the same direction in the other by about 35%.

When we consider the values of  $r$  for the several ages, however, the situation is obscured. There appears to be a gradual rise in correlation from practically no correlation at four years to .62.3 at 6 years, then a drop to practically nothing at 7 years and with a rise to .634 and .672 respectively at 8 years and eight years six months.

If we considered only the figures to 6 years inclusive, it might be inferred that drawing ability tended to rise in its correlation with intelligence because the more intelligent child responds more readily to the stimulus of school environment and instruction. The four year child, having newly arrived in school has not yet been exposed to school influences for a sufficient time to ensure his favorable reaction to it. Moreover, it is quite probable that the I. Q. for the 4 year child is somewhat less reliable than that of maturer children, because of the far greater difficulty in securing the cooperation of the younger child in testing. Owing to both these factors, it might be anticipated that the correlation would rise with chronological age. The six year child does react favorably in most cases to the test situation, and the amount of exposure of 6 year children to drawing instruction is far more uniform. The sudden drop in the coefficient at 6 years 6 months however, is not explicable on this basis - or on any basis now apparent to us.

It is quite possible that the rise at 8 years is due to the selected nature of the group from which most of these drawings were received. By the usual organization of primary schools most of the children of normal and supernormal intelligence have been eliminated from the first and second grades. The eight year groups therefore are highly selected for subnormality. This is proven by a comparison of the medians of the Intelligence quotients for these ages with those for all the children represented. The median for the Intelligence quotients of the 1420 children is 102.9, whereas the median for the eight year group is 90, for the 8 year six months group 82. It is quite probable that the correlation is higher for the orders of intelligence. This is somewhat contrary to Imchenstämmer's conclusion. The chances are greater that inferior ability in drawing will accompany markedly inferior intelligence than the converse. However, in considering individuals, there were numbers of children of low intelligence who showed considerable skill in drawing, as well as several children of high intelligence who were quite deficient in drawing.

These general conclusions, while offered only as suggestions for further study, are in line with the evidence previously presented - that the ability to draw among children of the same age increases from grade to grade, and that overage children in the first and second grades are usually less proficient in drawing than those of the normal ages for these grades.





The inference that correlation between representative power and intelligence is closer at the lower end of the scale is corroborated by a comparison of the quartile distribution for the two measures. For this purpose, the values for the four quartiles for both intelligence quotient and drawing quotients were determined. They were; for intelligence, 48-93, 94-103, 104-113, 114-173; for drawing, 48-97, 98-106, 107-116, 117-196. The number of children whose drawing quotients for each quartile fell within the several quartiles of the intelligence quotients was then counted. These values were translated into graphic form in Figure XII. The figure is to be interpreted: for the lowest quartile of the intelligence quotients, the Drawing quotients of 161 children fell in the same quartile, 114 in the second, 58 in the third and 24 in the fourth. For the second quartile of intelligence quotients, the Drawing quotients of 93 children fell within the 1st quartile, 106 in the second, 81 in the third; and 66 in the fourth, etc.

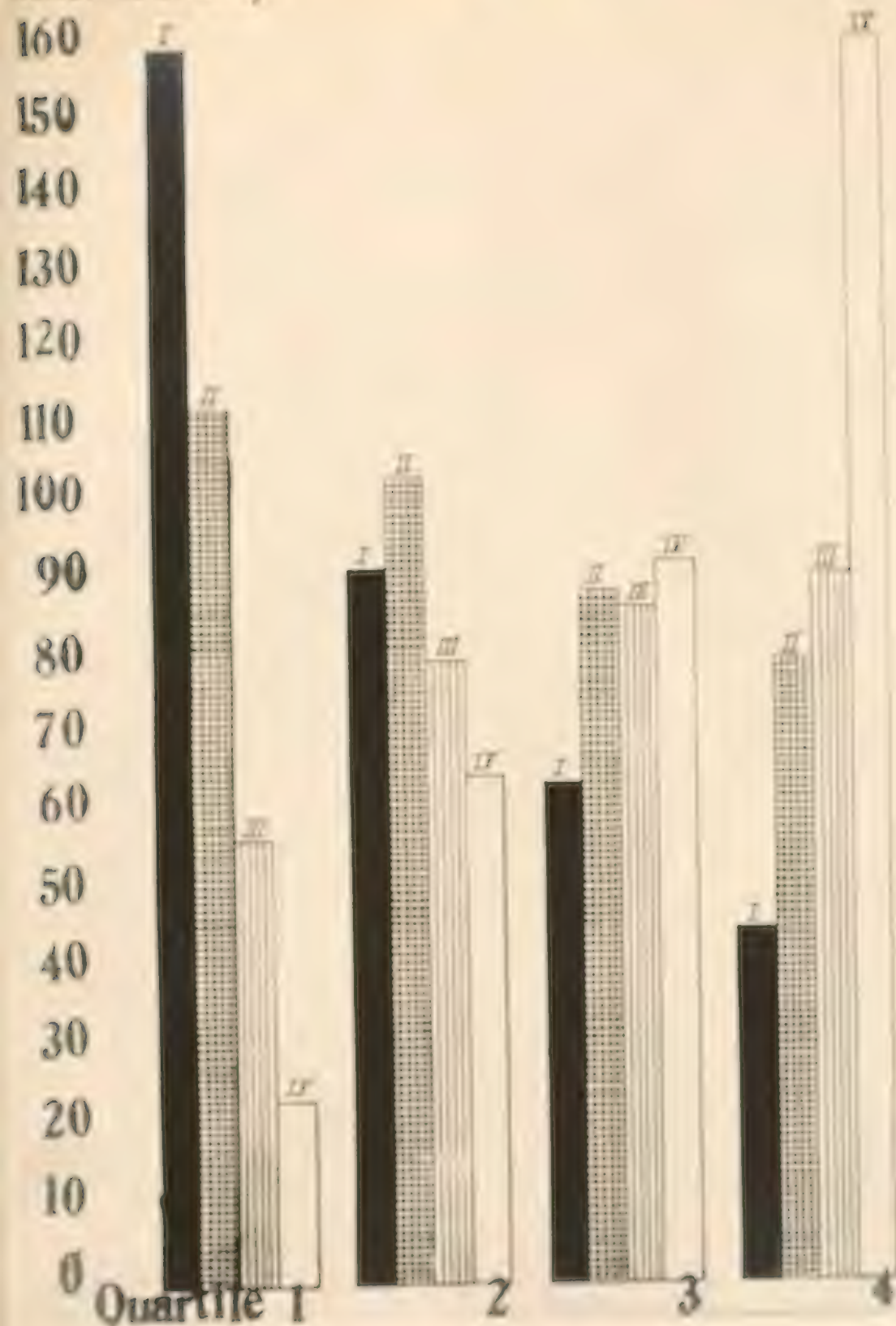
The figure brings out clearly the fact of the wide variability of the two scores. Twenty-four children with intelligence quotients of 24 or less were among the upper 25% in drawing achievement, while 46 children whose intelligence placed them in the upper 25 percentile had drawing scores among the lowest 25% of all the children. On the other hand, in all except the third quartile of Intelligence Quotients, for which the upper quartile of Drawing Quotients is slightly larger, the number of children whose Drawing Quotients fall within the same quartile is greater than any other. That the overlappings should be greater in the middle fifty percent was to be expected. The significant fact however, is that for the lowest quartile of Intelligence Quotients the number of children with superior ability in drawing is considerably less than the converse number for the upper quartile - 24 to 46. Stated in another way, while only 6.8 % of the children in the lowest group for intelligence excelled in drawing, 13. % of those in the highest group were markedly deficient in drawing. The assumption seems justified that while individuals of very low mentality are rarely superior in graphic representation, it is not so generally to be expected that intellectually brilliant individuals will excel in graphic arts. Drawing is probably a specialized trait which nevertheless involves elements dependent upon such mental traits as accurate observation, clear memory images, attention.





Figure XII

Number of Drawings



Quartile Distribution of Drawing Quotients compared with that for Intelligence Quotients. Reading: 160 Drawings which fell in the lowest quartile of I.Q.'s were also in the lowest quartile of D.Q.'s, etc.





## II. Illustrary Problems in Teaching!

Some questions concerning children's handling of the technique of drawing suggested themselves in view of the large mass of material available for their solution. Do children tend to represent objects in mass or in outline? To what extent do they view the human face in full view or in profile? How far are definite ideas of the relative magnitudes of objects manifested? What evidence, if any, is shown of the nonorthogonality of perspective in a picture?

It being practically impossible to include the whole collection of drawings in these investigations, about half of the original material was discarded, the selection being left wholly to chance. Later, all available drawings of the four and eight year children were added, and all the drawings of houses and of human beings that had previously been omitted. Thus, 18877 samples in all were examined. In this series of studies no attempt was made to segregate the work of the three grades, but the sex and age grouping were rigidly adhered to.

The drawings were first examined to discover what proportion of the children had made use of outline or mass, an inquiry the answer to which would be of practical value to many teachers of art in the kindergarten and primary grades. For present purposes, mass drawing was interpreted broadly to include all products in which the surface of the object had been filled in, regardless of whether it was circumscribed by a definite outline or not. Only those objects were considered as outline drawings in which the contour of the form alone was indicated. Faces in which parts were represented by their outlines only, and other parts in mass (as defined above) were classed as combination. The several objects of each drawing were tabulated individually. If any drawing contained all three types it was listed under the three headings - outline, mass, combination. An exception, however, was tabulated were there more than one object under each heading - so that if it contained two or more objects drawn in outline, and only one in mass, this fact was not recorded in any way. To a certain extent this procedure obscured the results; but since the probabilities are really in favor of a larger proportion of objects drawn with the predominating technique, the method used seems preferable. Our results are in terms of the number of children using each mode of representation. The data are presented in Table I, English form - by outline - in Table II, with the totals for girls and boys of each age and the matter of development which the data are based. Finally, the original figures have been converted into a percentage value, calculated on the total number of drawings examined for each age group.

Considering first the totals for each year, there is a marked preference for outline drawing among the four year children - nearly 75% of all four year old children showing this mode of representation. The percentage increases steadily up to eight years with the most marked increase at six. Mass drawing shows an opposite trend, starting with 25.2% at four years and increasing steadily to eight years, falling most markedly at six years. That these phenomena are the result of the retarding of colored



TABLE XXIX A

CONTINUED

| Sex         | 1946 |      | 1947 |      | 1948 |      | 1949 |      | 1950 |      | Total | Percent |
|-------------|------|------|------|------|------|------|------|------|------|------|-------|---------|
|             | M    | F    | M    | F    | M    | F    | M    | F    | M    | F    |       |         |
| 1           | 12   | 11   | 14   | 11   | 12   | 11   | 12   | 11   | 11   | 10   | 170   | 68.2    |
| 2           | 129  | 129  | 129  | 129  | 129  | 127  | 90   | 31   | 18   | 2    | 100   | 77.2    |
| 3           | 149  | 150  | 100  | 126  | 0    | 0    | 0    | 0    | 0    | 0    | 375   | 82.2    |
| 4           | 19   | 25   | 100  | 100  | 290  | 274  | 200  | 271  | 25   | 17   | 1120  | 72.2    |
| 5           | 19   | 25   | 104  | 81   | 73   | 74   | 28   | 24   | 0    | 3    | 340   | 82.2    |
| 6           | 0    | 0    | 29   | 37   | 73   | 72   | 43   | 40   | 13   | 3    | 200   | 82.2    |
| 7           | 0    | 1    | 42   | 81   | 4    | 1    | 0    | 0    | 0    | 0    | 128   | 82.2    |
| 8           | 0    | 4    | 0    | 46   | 0    | 55   | 45   | 31   | 0    | 0    | 130   | 82.2    |
| 9           | 0    | 0    | 20   | 20   | 30   | 47   | 20   | 20   | 1    | 1    | 100   | 82.2    |
| 10          | 0    | 0    | 0    | 0    | 34   | 31   | 27   | 23   | 0    | 0    | 115   | 82.2    |
| 11          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 0    | 3     | 82.2    |
| 12          | 1    | 3    | 13   | 123  | 102  | 100  | 22   | 26   | 0    | 1    | 250   | 82.2    |
| 13          | 19   | 22   | 20   | 43   | 27   | 23   | 23   | 31   | 22   | 13   | 200   | 82.2    |
| 14          | 57   | 30   | 62   | 72   | 17   | 14   | 0    | 0    | 16   | 11   | 200   | 82.2    |
| 15          | 37   | 40   | 0    | 0    | 62   | 72   | 44   | 40   | 19   | 0    | 300   | 82.2    |
| 16          | 20   | 15   | 0    | 10   | 11   | 11   | 15   | 0    | 0    | 0    | 62    | 82.2    |
| 17          | 19   | 0    | 30   | 20   | 20   | 20   | 27   | 20   | 7    | 0    | 200   | 82.2    |
| 18          | 0    | 0    | 10   | 10   | 42   | 37   | 25   | 21   | 13   | 0    | 200   | 82.2    |
| 19          | 19   | 15   | 42   | 62   | 0    | 61   | 0    | 0    | 16   | 20   | 430   | 82.2    |
| 20          | 11   | 0    | 10   | 20   | 0    | 0    | 0    | 0    | 0    | 0    | 31    | 82.2    |
| 21          | 0    | 24   | 20   | 30   | 10   | 30   | 10   | 10   | 0    | 4    | 107   | 82.2    |
| 22          | 20   | 20   | 20   | 20   | 0    | 0    | 10   | 10   | 0    | 0    | 170   | 82.2    |
| 23          | 100  | 100  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 200   | 82.2    |
| 24          | 0    | 0    | 17   | 14   | 2    | 1    | 4    | 1    | 3    | 1    | 34    | 72.2    |
| 25          | 10   | 20   | 30   | 40   | 100  | 112  | 74   | 71   | 0    | 4    | 400   | 82.2    |
| 26          | 0    | 0    | 104  | 140  | 170  | 174  | 0    | 0    | 4    | 0    | 500   | 82.2    |
| Total       | 797  | 807  | 1296 | 1804 | 1713 | 1807 | 1019 | 977  | 274  | 241  | 19139 | 82.2    |
| Number of   |      |      |      |      |      |      |      |      |      |      |       |         |
| Drawings    | 1061 | 1176 | 1802 | 2005 | 2001 | 2001 | 2412 | 2202 | 407  | 400  | 14427 |         |
| Percent     | 74.9 | 71.2 | 69.4 | 67.8 | 67.1 | 63.5 | 41.9 | 41.0 | 33.9 | 26.8 |       | 82.2    |
| Boys &      |      |      |      |      |      |      |      |      |      |      |       |         |
| Girls       | 1434 |      | 2670 |      | 3380 |      | 1005 |      | 31.8 |      |       |         |
| Percent     | 72.9 |      | 66.0 |      | 66.3 |      | 41.4 |      | 30.2 |      |       |         |
| 3 Clippings |      |      |      |      |      |      |      |      |      |      |       |         |
| Submitted   | 76.1 | 72.8 | 74.9 | 72.3 | 66.9 | 71.9 | 32.4 | 42.1 | 44.3 | 32.3 |       | 82.2    |



TABLE XIII B

DAYS.

| dYrs |      | dYrs |      | dYrs |      | dYrs |      | dYrs |      | Total | Percent | Number of<br>Drawings. |
|------|------|------|------|------|------|------|------|------|------|-------|---------|------------------------|
| 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |       |         |                        |
| 11   | 14   | 17   | 20   | 100  | 104  | 100  | 107  | 140  | 134  | 1170  | 61.3    | 2207                   |
| 16   | 17   | 20   | 40   | 27   | 70   | 17   | 24   | 10   | 7    | 200   | 20.1    | 1247                   |
| 16   | 17   | 20   | 20   |      |      |      |      |      |      | 110   | 10.0    | 570                    |
| 3    | 3    | 12   | 17   | 107  | 94   | 110  | 100  | 14   | 10   | 570   | 32.9    | 1003                   |
| 12   | 12   | 12   | 10   | 107  | 100  | 100  | 90   | 9    | 11   | 501   | 24.4    | 874                    |
|      |      | 14   | 20   | 87   | 100  | 10   | 91   | 10   | 10   | 470   | 21.3    | 701                    |
|      |      | 14   | 14   |      | 1    |      |      |      |      | 20    | 10.0    | 104                    |
| 3    |      | 14   | 14   | 40   | 100  | 40   | 40   | 14   | 10   | 200   | 44.0    | 904                    |
|      |      | 7    | 4    | 21   | 100  | 20   | 37   |      | 2    | 100   | 41.9    | 201                    |
|      |      |      |      | 20   | 10   | 40   | 90   |      |      | 100   | 10.0    | 200                    |
|      |      |      |      |      |      |      |      | 10   | 10   | 20    | 10.0    | 10                     |
| 3    | 1    | 14   | 107  | 107  | 100  | 200  | 117  |      |      | 1010  | 60.2    | 1000                   |
| 4    | 11   | 7    | 10   | 14   | 11   | 10   | 10   | 10   | 11   | 100   | 10.7    | 400                    |
| 11   | 11   | 20   | 40   | 20   | 11   | 7    | 10   | 40   | 40   | 200   | 44.0    | 904                    |
| 14   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 7    | 3    | 170   | 27.1    | 600                    |
| 4    | 2    | 2    | 3    | 3    | 3    | 2    | 1    |      |      | 20    | 10.0    | 100                    |
| 3    | 4    | 12   | 10   | 14   | 10   | 10   | 10   | 10   | 11   | 100   | 37.0    | 414                    |
|      |      | 7    | 10   | 17   | 14   | 40   | 40   | 40   | 20   | 200   | 40.0    | 500                    |
| 3    | 3    | 10   | 14   | 140  | 140  | 147  | 100  | 110  | 101  | 500   | 60.7    | 1400                   |
| 3    | 3    | 10   | 10   |      | 3    |      |      |      |      | 10    | 40.0    | 100                    |
| 1    | 3    | 11   | 7    | 9    | 14   | 14   | 10   | 11   | 11   | 100   | 10.7    | 270                    |
| 3    | 11   | 7    | 3    | 4    | 3    | 3    | 2    | 3    | 14   | 70    | 22.1    | 207                    |
| 10   | 10   |      |      |      |      |      |      |      |      | 27    | 20.0    | 400                    |
| 3    | 3    |      | 2    | 1    |      | 1    | 1    |      | 1    | 10    | 21.0    | 70                     |
| 11   | 17   | 10   | 10   | 10   | 70   | 77   | 100  | 7    | 3    | 300   | 40.1    | 700                    |
| 10   | 10   | 10   | 10   | 140  | 170  | 110  | 104  | 3    | 2    | 304   | 47.7    | 1000                   |
| 200  | 114  | 400  | 171  | 1410 | 1470 | 1700 | 1200 | 111  | 710  | 2000  | 40.0    | 10000                  |
| 20.0 | 27.0 | 20.0 | 10.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 70.0 |       | 40.0    |                        |
| 100  |      | 1100 |      | 2000 |      | 2000 |      | 1000 |      |       |         |                        |
| 20.0 |      | 20.0 |      | 40.0 |      | 40.0 |      | 71.0 |      |       |         |                        |
| 24.0 | 20.0 | 10.0 | 17.0 | 17.0 | 40.0 | 40.0 | 40.0 | 40.0 | 70.0 | 20.4  |         |                        |





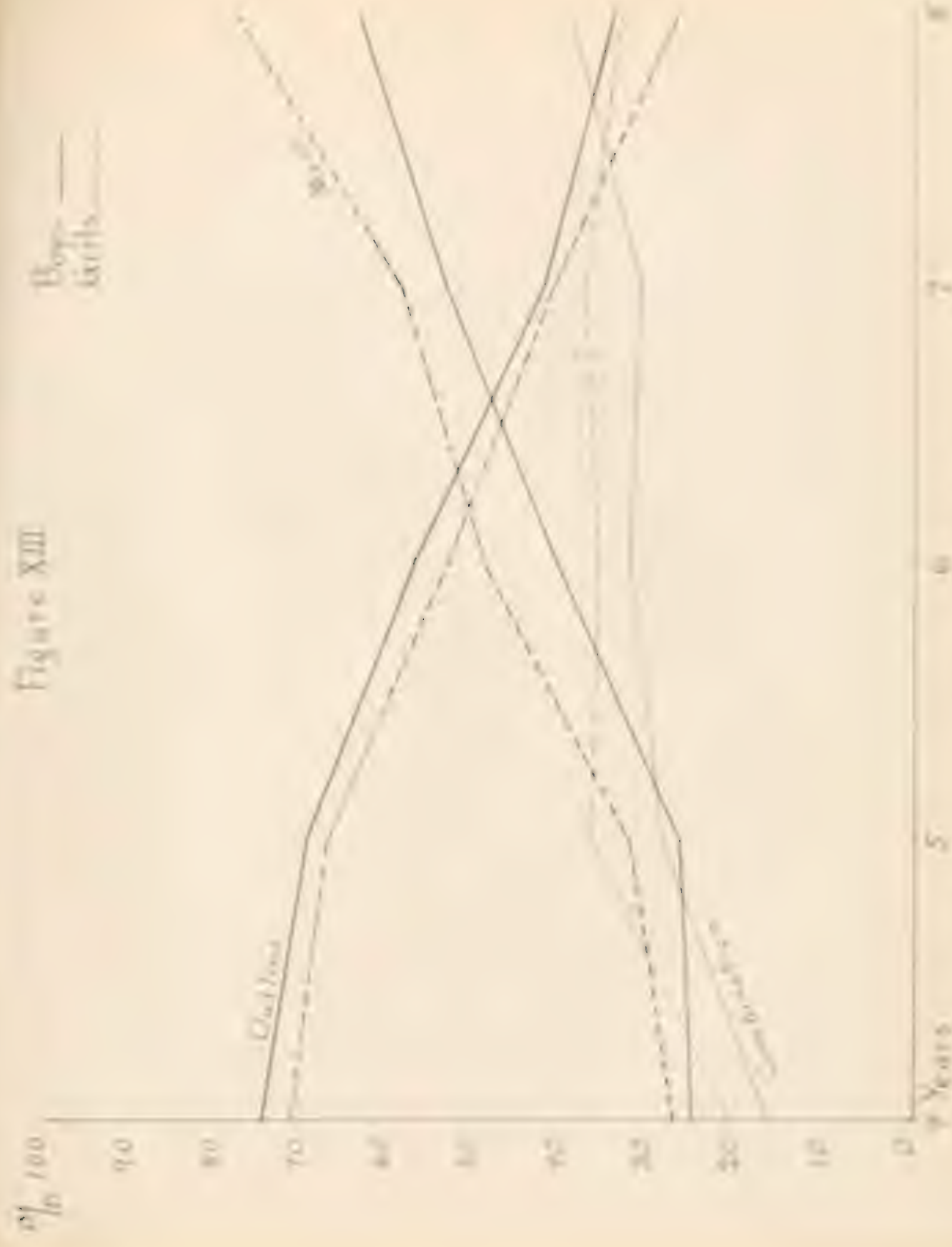
TABLE XIII C

Continued.

| City      | Wire |      | Wire |      | Wire |      | Wire |      | Wire |      | Total | Percent |
|-----------|------|------|------|------|------|------|------|------|------|------|-------|---------|
|           | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |       |         |
| A         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| B         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| C         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| D         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| E         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| F         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| G         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| H         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| I         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| J         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| K         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| L         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| M         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| N         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| O         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| P         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| Q         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| R         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| S         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| T         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| U         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| V         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| W         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| X         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| Y         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| Z         | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 100   | 100.0   |
| Total     | 174  | 247  | 500  | 735  | 172  | 1064 | 787  | 481  | 117  | 298  | 6284  | 81.8    |
| Number of |      |      |      |      |      |      |      |      |      |      |       |         |
| Percent   | 11.8 | 16.5 | 33.3 | 48.3 | 12.3 | 74.1 | 51.1 | 32.4 | 7.3  | 18.1 |       | 74.1    |
| Boys &    |      |      |      |      |      |      |      |      |      |      |       |         |
| Girls     | 421  |      | 1293 |      | 2005 |      | 1849 |      | 11.5 |      |       |         |
| Percent   | 18.1 |      | 33.3 |      | 54.2 |      | 54.2 |      | 24.0 |      |       |         |
| 5 Cities  |      |      |      |      |      |      |      |      |      |      |       |         |
| Omitted   | 16.8 | 11.8 | 23.4 | 34.0 | 51.8 | 51.7 | 51.0 | 54.3 | 44.4 | 34.3 | 41.0  |         |



Figure XIII.



Comparison of Sexes and Ages in Use at Mass and Outlines.





indications, however, is by no means clear. In consideration of the returns from the various cities suggests at least a shift of some or overpopulation. In the drawings from one ciliated mollusk population throughout the five year period, evidence is shown that such a shift is considerable especially in the fifth year. In consideration of the percentages of hard and medium drawing for each city, even disregarding those cities in which the later years are inadequately represented, there is wide range of variation. City 1, having an eight year representation has percentages of 33.7 and 33.8 respectively for ciliated and hard, while City 2, with approximately proportional representation of its age groups, has 33.2 and 41.2. The deviations are so wide that it seemed worthwhile to calculate a new group of percentile values, eliminating the age cities in which mass drawing was found to considerably larger extent than was usual throughout the five years - Cities 3, 4, 5, 6, and 7. This series of values is given at the end of the table. It will be seen that the seven year series is not appreciable increase in the percentage of mollusk drawings - 1.0, 4.8, 4.1, 2.8, and 7.2 for the five years respectively; and a corresponding decrease in the percentage of hard drawings - 1.0, 4.7, 3.1, 7.0, and 4.3. For the eight year group there are virtually no drawings for Cities 3, 4, and 5, so that the smallest shift probably is appreciably greater if these three cities had been adequately represented.

The significant fact is that the cities, representing only 14.2% of the mass, should have modified the general averages as markedly as they have. In the cities - 3 and 5 - mass drawing nearly equal mollusks in the four year groups, but in both cases the shells themselves - the end of the tube of the snapper, producing forms that were ill-defined, wavy and irregular - is absolutely ignored and unutilized. In no other cases was there an appreciable amount of work in which the mollusk was entirely utilized.

The cultural inference, in consideration of all the data, is that mollusk drawing is normal with the majority (at least three-fourths) of four year children and that the transition to mass is, at least in part, the result of social instruction. The question - just how far and at what social instruction should attempt to modify this trend of expression and how far the trend be reversed.

Age differences are indicated in the table and have already presented in Figure 11. As we noticed last year, from the beginning, and throughout the five years, yet the mollusk drew frequently, and even more frequently than the boys. The ciliated explanations may be suggested - the greater growth of girls, assuming that mass drawing is a matter of cultural power, and much greater facility in manipulating or constructing assuming that mass drawing is the result of social influence.



The drawings of the human figure were, as mentioned, so categorized for the children based on three face or profile views. Four general types of representation were encountered: (1) the conventional full face view, (2) the conventional profile, (3) the mixed, in which the features are so combined that it is impossible to determine whether the subject has full face or profile, and (4) the mixed type, which contains certain characteristics of the two views, for example, representing the head and shoulders, the general outline of the face, in profile; the two eyes, nose and mouth symmetrically placed as in a front view.

Table XIV presents the data for the several cities, with the totals and the percentages for the several ages and for both sexes. The percentages are based on the total number of drawings of human beings, which is shown for each city in the last column and for the general summary on the base line. The totals are also shown graphically in Figure 14. There is a marked tendency of four year old children to draw the full face, with a gradual increase in the number of profile drawings through the sixth year. With the exception of two, 8 and 11.4 (see in parenthesis), the cities are fairly well matched in their percentage values, the differences being attributable to the differences in the age distributions of the children represented.

These results are in harmony with the findings of earlier investigators - Sloan, Loomis, and Hall. - Several explanations have been offered for these tendencies. It has been argued that the young child draws the front view because he is representing his own face, which he sees in the mirrored image - always there to him. Again it has been suggested that it is the full face that first arrests the attention and interest of every child because of its activity, and its higher meaning. It therefore perhaps that he sees more clearly and more best, partly colored by his consciousness of the difficulty of the subject or the grotesque character of his own results. Probably, with increased observation and experience of reality and developing appreciation of aesthetic values arises the consciousness of the technical difficulties in the portrayal of the human face, and of his own short-comings in attempting it. With the dawn of self-criticism comes hesitation. The first result is a decided falling off in attempts to reproduce even at all - as is evidenced in Chapter I. The second, it has been suggested, is the discovery that the profile is technically less difficult, less grotesque in its results. Hence a somewhat deliberate choice of the profile view, which continues to grow in favor through the years exceeding our own period of interest. It has also been proposed that the mixed type marks the transition from full face to profile, and may be taken as an indication of the approach of the period of self-criticism.

There is no definite evidence in favor of these last influences. The fact that the mixed type at no period compares more than 5.1% of the total, whereas the profile drawings for this same year number 31.4% argues against the view that this type is transitional in any general



TABLE XIX

Page.

| Age          | 4Yrs |      | 5Yrs |      | 6Yrs |      | 7Yrs |      | 8Yrs |      | Total | Percent |
|--------------|------|------|------|------|------|------|------|------|------|------|-------|---------|
|              | M    | F    | M    | F    | M    | F    | M    | F    | M    | F    |       |         |
| A            | 30   | 34   | 32   | 71   | 113  | 150  | 84   | 70   | 37   | 70   | 711   | 71.5    |
| B            | 41   | 36   | 131  | 140  | 84   | 106  | 37   | 31   | 8    | 6    | 499   | 49.1    |
| C            | 33   | 29   | 39   | 39   | 1    |      |      |      |      |      | 132   | 13.4    |
| D            | 1    | 13   | 71   | 39   | 143  | 180  | 32   | 133  | 10   | 13   | 731   | 73.4    |
| E            | 8    | 12   | 33   | 33   | 37   | 44   | 14   | 37   | 3    |      | 222   | 22.5    |
| F            |      |      | 17   | 34   | 34   | 34   | 37   | 34   | 13   | 8    | 215   | 21.8    |
| G            | 4    | 1    | 37   | 48   | 8    | 1    |      |      |      |      | 85    | 8.4     |
| H            | 4    | 1    | 34   | 37   | 37   | 34   | 33   | 42   | 13   | 13   | 248   | 24.8    |
| I            |      |      | 10   | 8    | 14   | 22   | 8    | 22   | 1    | 1    | 62    | 6.2     |
| J            |      |      | 7    |      | 33   | 34   | 13   | 34   |      |      | 45    | 4.5     |
| K            |      |      |      |      |      |      |      |      | 3    | 7    | 8     | 0.8     |
| L            | 1    | 4    | 31   | 113  | 34   | 144  | 41   | 70   |      |      | 379   | 38.4    |
| M            | 3    | 13   | 26   | 34   | 100  | 70   | 13   | 34   | 8    | 13   | 187   | 18.8    |
| N            | 17   | 26   | 33   | 31   | 13   | 17   | 3    | 2    | 14   | 13   | 131   | 13.2    |
| O            | 13   | 31   | 38   | 42   | 42   | 47   | 29   | 33   | 13   | 7    | 313   | 31.4    |
| P            | 13   | 12   | 3    | 8    | 8    | 12   | 6    | 4    |      |      | 45    | 4.5     |
| Q            | 2    | 2    | 30   | 41   | 38   | 34   | 30   | 13   | 1    | 8    | 137   | 13.8    |
| R            |      |      | 13   | 28   | 39   | 33   | 28   | 31   | 20   | 12   | 222   | 22.4    |
| S            | 3    | 9    | 32   | 47   | 44   | 37   | 48   | 70   | 17   | 32   | 333   | 33.3    |
| T            | 3    | 7    | 10   | 13   | 2    | 3    |      |      |      |      | 48    | 4.8     |
| U            |      | 17   | 22   | 33   | 14   | 34   | 13   | 17   | 3    | 3    | 143   | 14.3    |
| V            | 11   | 11   | 13   | 31   | 7    | 4    | 3    | 8    | 3    | 4    | 59    | 5.9     |
| W            | 32   | 30   |      |      |      |      |      |      |      |      | 170   | 17.0    |
| X            | 4    | 1    | 12   | 11   | 2    | 3    | 2    | 1    |      | 3    | 43    | 4.3     |
| Y            | 3    | 4    | 27   | 43   | 41   | 39   | 36   | 32   | 2    | 4    | 292   | 29.2    |
| Z            | 13   | 31   | 104  | 122  | 101  | 143  | 33   | 34   | 3    |      | 634   | 63.4    |
| Total        | 259  | 443  | 876  | 1135 | 1408 | 1323 | 600  | 604  | 188  | 224  | 6707  | 73.2    |
| Percent      | 32.1 | 34.1 | 33.9 | 30.3 | 37.5 | 73.4 | 30.3 | 33.3 | 32.3 | 34.3 |       |         |
| Boys & Girls | 732  |      | 1940 |      | 2187 |      | 1404 |      | 414  |      |       |         |
| Percent      | 33.2 |      | 30.0 |      | 72.1 |      | 37.4 |      | 33.3 |      |       |         |
| Total        | 314  | 471  | 1039 | 1239 | 1408 | 1309 | 1132 | 1233 | 339  | 332  | 6145  |         |





## TABLE III B

## PROFES.

| TYPE    | Boys |     | Girls |      | Boys |      | Girls |      | Boys |      | Girls |    | Total | Percent |
|---------|------|-----|-------|------|------|------|-------|------|------|------|-------|----|-------|---------|
|         | 1    | 2   | 3     | 4    | 5    | 6    | 7     | 8    | 9    | 10   | 11    | 12 |       |         |
| A       |      |     | 4     | 1    | 10   | 7    | 24    | 10   | 52   | 19   |       |    | 107   | 18.5    |
| B       | 2    |     | 3     | 0    | 17   | 0    | 0     | 0    | 7    | 0    |       |    | 27    | 7.9     |
| C       |      |     | 1     |      |      |      |       |      |      |      |       |    | 1     | 1.5     |
| D       |      |     | 1     |      | 15   | 4    | 41    | 14   | 3    | 1    |       |    | 65    | 12.1    |
| E       |      |     | 2     | 0    | 21   | 20   | 27    | 23   | 3    | 0    |       |    | 106   | 11.9    |
| F       |      |     | 2     |      | 15   | 0    | 21    | 10   | 10   | 11   |       |    | 64    | 10.8    |
| G       |      |     | 1     | 1    |      |      |       |      |      |      |       |    | 2     | 1.5     |
| H       |      |     |       | 4    | 0    | 0    | 0     | 10   | 4    | 3    |       |    | 17    | 13.1    |
| I       |      |     |       |      | 1    | 4    | 0     | 1    | 1    |      |       |    | 13    | 12.6    |
| J       |      |     |       |      | 4    | 0    | 0     | 0    |      |      |       |    | 4     | 11.8    |
| K       |      |     |       |      |      |      |       |      |      |      |       |    | 0     | 47.4    |
| L       |      |     | 10    | 20   | 15   | 90   | 100   | 90   |      |      |       |    | 415   | 54.5    |
| M       |      |     |       | 3    | 2    | 1    | 0     | 3    | 2    | 0    |       |    | 20    | 17.9    |
| N       |      |     | 0     | 1    | 4    | 2    |       | 3    | 7    | 17   |       |    | 36    | 18.6    |
| O       |      |     |       |      | 0    | 3    | 0     | 4    | 2    | 2    |       |    | 20    | 3.0     |
| P       |      |     | 0     | 1    | 3    | 1    | 4     | 1    |      |      |       |    | 15    | 14.5    |
| Q       |      |     | 0     |      | 0    | 0    | 0     | 7    | 2    | 1    |       |    | 20    | 10.8    |
| R       |      |     | 1     |      | 0    |      | 0     | 10   | 0    | 0    |       |    | 11    | 14.1    |
| S       |      |     | 0     |      | 4    | 13   | 10    | 22   | 26   | 16   |       |    | 136   | 23.7    |
| T       |      |     | 1     |      | 0    |      |       |      |      |      |       |    | 1     | 3.0     |
| U       |      |     | 1     |      | 3    | 4    | 0     | 0    | 7    | 1    |       |    | 26    | 24.0    |
| V       |      |     | 2     | 1    | 0    | 1    | 1     | 0    | 0    | 1    |       |    | 16    | 11.4    |
| W       |      |     | 1     |      |      |      |       |      |      |      |       |    | 1     | 3.0     |
| X       |      | 1   | 1     |      |      |      |       |      |      |      |       |    | 2     | 4.1     |
| Y       |      |     | 1     |      | 10   | 10   | 20    | 24   | 1    |      |       |    | 62    | 10.2    |
| Z       |      |     | 2     | 3    | 7    | 30   | 22    | 17   |      | 1    |       |    | 111   | 22.3    |
| Total   | 7    | 4   | 61    | 62   | 300  | 282  | 365   | 304  | 133  | 27   |       |    | 1093  | 27.4    |
| Percent | 2.2  | .3  | 5.4   | 5.0  | 20.9 | 18.7 | 32.4  | 24.1 | 37.2 | 27.6 |       |    |       |         |
| Boys &  |      |     |       |      |      |      |       |      |      |      |       |    |       |         |
| Girls   | 11   |     | 113   |      | 500  |      | 507   |      | 180  |      |       |    |       |         |
| Percent | 5.4  |     | 5.2   |      | 18.1 |      | 28.1  |      | 14.4 |      |       |    |       |         |
| Total   | 114  | 471 | 639   | 1239 | 1845 | 1609 | 1162  | 1236 | 358  | 382  |       |    | 6169  |         |



TABLE BIII D

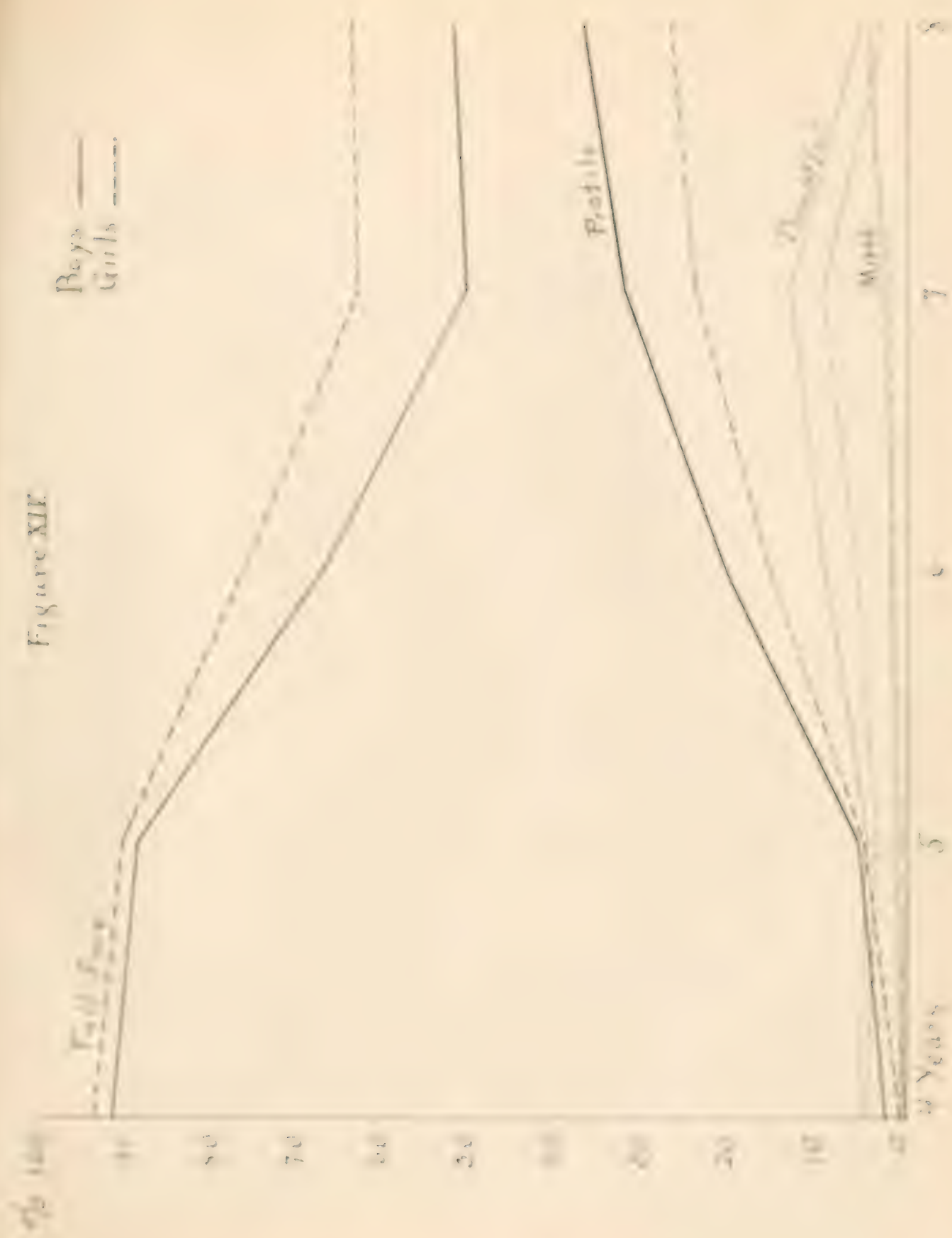
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| FLAG    | Wire |     | Wire |      | Wire |      | Wire |      | Wire |     | Total | Percent |
|---------|------|-----|------|------|------|------|------|------|------|-----|-------|---------|
|         | 1    | 2   | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10  |       |         |
| 1       |      | 1   | 4    | 5    | 15   | 9    | 10   | 4    | 7    | 4   | 64    | 8.1     |
| 2       | 5    | 2   | 8    | 5    | 17   | 4    | 2    | 3    |      |     | 59    | 8.7     |
| 3       | 2    | 2   |      | 1    |      |      |      |      |      |     | 4     | 2.7     |
| 4       |      |     | 3    | 4    | 5    | 1    | 13   | 2    |      |     | 33    | 2.4     |
| 5       | 1    | 1   | 4    | 2    | 11   | 13   | 20   | 13   | 1    | 1   | 104   | 21.0    |
| 6       |      |     | 1    | 1    | 8    | 2    | 2    | 1    | 1    |     | 13    | 3.4     |
| 7       |      |     | 1    |      |      |      |      |      |      |     | 1     | 1.4     |
| 8       |      | 1   | 2    | 5    | 2    | 2    | 1    | 1    |      |     | 14    | 2.4     |
| 9       |      |     |      |      | 5    | 2    |      | 3    |      |     | 10    | 3.2     |
| 10      |      |     |      |      | 2    | 3    | 4    | 1    |      |     | 11    | 3.7     |
| 11      |      |     | 7    | 4    | 33   | 26   | 49   | 43   | 1    |     | 164   | 34.3    |
| 12      | 1    | 5   | 5    | 5    | 2    | 1    | 1    | 7    |      | 2   | 33    | 3.7     |
| 13      | 1    | 1   | 5    | 5    | 1    |      |      |      |      |     | 13    | 3.7     |
| 14      |      |     |      | 1    | 2    |      | 2    |      |      |     | 4     | 2.4     |
| 15      |      |     |      |      |      | 1    |      | 1    |      |     | 2     | 1.0     |
| 16      | 1    |     |      |      | 1    | 4    | 5    | 1    |      |     | 11    | 4.4     |
| 17      |      |     |      | 1    | 1    | 2    | 1    |      | 2    |     | 10    | 2.4     |
| 18      | 1    | 1   | 4    | 1    | 17   | 6    | 14   | 12   | 4    | 3   | 74    | 21.8    |
| 19      |      |     | 1    | 1    |      |      |      |      |      |     | 2     | 1.4     |
| 20      |      |     | 1    | 1    | 4    | 2    | 5    | 2    |      |     | 13    | 3.0     |
| 21      |      |     | 1    | 1    |      |      | 3    |      |      |     | 4     | 3.4     |
| 22      | 1    |     |      |      | 1    |      |      |      |      |     | 1     | 1.4     |
| 23      | 1    |     |      |      | 3    | 4    | 10   | 7    | 1    |     | 23    | 7.7     |
| 24      | 4    | 6   | 4    | 7    | 13   | 7    | 14   | 13   | 1    |     | 73    | 8.4     |
| Total   | 17   | 22  | 43   | 44   | 143  | 97   | 163  | 126  | 20   | 10  | 693   | 7.3     |
| Percent | 5.4  | 4.7 | 4.8  | 3.4  | 9.9  | 6.0  | 11.8 | 10.0 | 3.4  | 2.4 |       |         |
| Mean    | 79   |     | 89   |      | 140  |      | 201  |      | 30   |     |       |         |
| Percent | 5.0  |     | 4.1  |      | 7.9  |      | 11.9 |      | 4.2  |     |       |         |
| Total   | 314  | 471 | 273  | 1333 | 1400 | 1073 | 1142 | 1243 | 200  | 132 | 5191  |         |





Figure XII



Comparison of Series and Ages in Drawing of Human Face



case. It is probably transitional with these children. The very other examples of children's drawings, the almost portraits appeared to be the result of an individual child's motivation, rather of chance, or of purpose, or of imitative effort. The boy here used the profile and then added the features which he knew to be there, just as he frequently adds the furniture in the house to the exterior view, or the second leg of the man on horseback, which he knew to be on the other side of the horse. The boy here started with a profile in mind and then reverted to the more habitual and familiar view. In, finally, he had been caught that memory the view he had seen in adult portraits, and, forgetting the details, supplied the missing elements from his habitual modes of expression.

The profile itself may arise possibly in the result of school instruction, as the very exercises in drawing from the living model would suggest; or of other observation both of the house form itself and of the technique of others, with the corresponding desire to reproduce this new view. Certain limitations in the cities are at least suggestive of instruction as a large contributing factor - notably the high percentage of full face drawings and the correspondingly low percentage of profiles in City B, which is known to be a heart advocate of freedom and self-expression, and an ardent enemy to the tradition of technique.

Sex differences again appear. The percentage of full face drawings is constantly greater for the girls in every year, and the percentage of profiles is correspondingly less. No sound explanation for this fact suggests itself. It is possibly the result of a more objective and impersonal interest on the part of boys, leading them to see, and represent what they see, from the least naive and intimate viewpoint.

Featureless drawings - in which the figure was so placed as to conceal the facial features, or in which the face was represented but void of all the natural organs - appeared to be popular to certain cities. Number 322 of the series is typical of this profile - plainly a desire to avoid the grotesquery of children's portraits, but a desire of making merit. For it might easily evolve the very self-distort which it is meant to overcome. It might deprive the pure subconscious young artist of that sense of power which ultimately brings success; and of that practice which results in power. From the psychologist's standpoint it suggests an uncorrected restraint upon self-expression.

The same 1927 specimen might had been studied for the use of value and tone were again studied to discover how far the children showed evidence of a sense of balance or symmetry in the arrangement of their drawings. Balance for this purpose meant, not conventional design, but the placing of forms in relation to each other, for example, a house with a tree on a street on each side, an interior view of a window



flanked by two pistons, a table with two stoves symmetrically placed, the front elevation of a house with stairs and chimney clearly balanced, there is a proportion almost to this study, since there may be considerable variation in judgment as to just what constitutes balance. There may also be a large element of chance in the arrangement of the drawings themselves - as that it is impossible to judge the comparative intention of the Designer - sometimes, the results are at least suggestive. They are given in detail for the several cities and ages for later review in Table XIV.

It is quite clear that, naturally in some instances, spacing of arrangement plays but a small part in the drawing of these children - a little more than that next. It is also clear that it is least present in the four year old child (85), increasing very gradually to a maximum of 4.2% at the eighth year, but reaching slightly to the ninth. For the very purpose is not higher at the Kindergarten (100%) age in of pedagogical interest. It was unfortunate if it proved to be a noticeable degree. One drawing by a six year child is distinctly descriptive, showing a car with seven but highly conventionalized, flanked on either side by a gentleman, holding a cane of relatively smooth size - not so proportioned as to form a distinctly pleasing whole.

The variations in the city scores are slight enough to be easily accounted for by differences of age distribution and other accidental causes. The age distribution, however, are noteworthy. In every year the girls exceed the boys, with increasing differences of .1, .3, 1.1, 1.4, and 1.7% respectively. This is in accord with the other evidence of the girls' greater interest in artistic values, in design and nature. Comparison of the figures for balance and those for design reveals contrasts worthy of passing notice. The first is that balance scores tend more frequently than conventional design, with a total of 1.2% as against .5%. The second is that while balance evidences a steadily increasing interest from year to year, design appears most attractive to the Kindergarten group, declining from .2% to .1% in the first grade and .4 in the second. It seems safe to infer even to as far as the younger children as least in design they lead because of direct educational influences, rather than naturally moving interest.

A study of the sense of proportion as formulated by the drawings was found to exist. Proportion was defined as an approximately true representation of the relative size of the objects in a picture, proportion of parts of a single object being excluded by reason of the greater difficulty of judgment. It is a matter of common observation among teachers of young children that many of them ignore completely the proportions of the various parts of a picture. Each object is drawn for itself alone, and even when several are related in a narrative or descriptive "composition", the one frequently towers over the others, the three or the garden wall surrounding the tree beside it, the wall is quite competent to say the dog.

We cannot deny that children are conscious of the differences in magnitude in these objects illustrated. Even a normal two year old





TABLE XXV  
BALANCE

| Date      | Apr. |      | May. |      | June. |      | July. |      | Aug. |      | Total | Per acre |
|-----------|------|------|------|------|-------|------|-------|------|------|------|-------|----------|
|           | 1    | 2    | 3    | 4    | 5     | 6    | 7     | 8    | 9    | 10   |       |          |
| 1         | 1    |      | 2    | 2    | 6     | 11   | 13    | 16   | 3    | 11   | 55    | 1.4      |
| 2         |      | 1    | 2    | 2    | 2     | 7    | 2     | 1    | 1    | 3    | 18    | 1.2      |
| 3         | 4    | 1    | 1    | 1    |       |      |       |      |      |      | 18    | 1.2      |
| 4         |      |      |      | 4    | 4     | 7    | 6     | 14   |      | 4    | 39    | 1.2      |
| 5         |      |      | 5    | 2    | 4     | 10   | 7     | 3    |      |      | 39    | 1.2      |
| 6         |      |      | 5    | 2    | 8     | 4    | 11    | 16   |      | 4    | 47    | 1.2      |
| 7         |      |      | 2    | 1    |       |      |       |      |      |      | 3     | 1.4      |
| 8         |      |      | 1    | 1    | 8     | 8    | 8     | 6    | 1    | 4    | 31    | 1.2      |
| 9         |      |      |      |      | 3     | 4    | 1     | 6    |      | 1    | 14    | 1.2      |
| 10        |      |      |      |      | 5     | 4    | 10    | 10   |      |      | 39    | 1.2      |
| 11        |      |      |      |      |       |      |       |      |      | 1    | 1     | 1.4      |
| 12        |      |      | 7    | 9    | 20    | 28   | 6     | 9    |      |      | 69    | 1.2      |
| 13        |      | 1    | 1    | 2    | 3     | 3    |       | 1    | 3    | 1    | 12    | 1.2      |
| 14        |      |      | 6    | 3    | 2     | 4    | 3     | 4    | 10   | 9    | 39    | 1.2      |
| 15        |      |      | 1    | 1    |       | 1    | 1     | 2    |      |      | 4     | 1.2      |
| 16        |      |      |      |      |       |      | 1     | 1    |      |      | 2     | 1.2      |
| 17        |      |      | 1    |      |       | 2    | 4     | 3    | 3    | 3    | 16    | 1.2      |
| 18        |      |      | 1    | 1    | 3     | 3    | 1     | 3    | 3    | 4    | 21    | 1.2      |
| 19        |      | 1    | 3    | 7    | 7     | 4    | 8     | 6    | 1    | 5    | 38    | 1.2      |
| 20        |      |      | 8    | 2    |       |      |       |      |      |      | 9     | 1.2      |
| 21        |      |      |      | 2    |       | 3    | 2     | 2    |      | 1    | 10    | 1.2      |
| 22        |      | 1    |      | 3    | 2     | 1    | 2     | 6    |      | 1    | 14    | 1.2      |
| 23        |      |      |      |      |       |      |       |      |      |      |       | 1.2      |
| 24        |      |      |      |      |       |      |       |      |      |      |       | 1.2      |
| 25        |      |      |      |      |       |      |       |      |      |      |       | 1.2      |
| 26        |      | 1    | 3    | 3    | 4     | 10   | 7     | 12   | 1    |      | 40    | 1.2      |
| 27        |      |      |      | 2    | 4     | 2    | 10    | 2    | 3    |      | 24    | 1.2      |
| Total     | 5    | 7    | 43   | 52   | 86    | 121  | 99    | 132  | 30   | 49   | 696   | 1.2      |
| Number of |      |      |      |      |       |      |       |      |      |      |       |          |
| Deeds     | 1061 | 1176 | 1280 | 1395 | 1501  | 1601 | 1712  | 1812 | 1917 | 2014 | 14467 |          |
| Per acre  | .6   | .6   | 1.3  | 1.5  | 2.9   | 4.0  | 4.1   | 5.6  | 6.7  | 6.4  |       | 1.2      |
| Per 100   | 12   |      | 1.6  |      | 1.7   |      | 1.1   |      | 7.9  |      |       |          |
| Per cent  | .6   |      | 1.4  |      | 1.4   |      | 4.8   |      | 4.8  |      |       |          |



will involve the larger world, and will give between a "small flower" and a "big flower" a representing a local comprehension of relative sizes. The preliminary and low level sensory primary children are likely unable to interpret the differences they see in terms of two dimensional space, and in magnitude quite different from those of the original flowers.

On observing the extent to which these children are able to apply proportion, the DDT thought was again extended. The question, "Do the normal objects represent approximately the relative sizes of these objects in life?" was asked concerning wall drawing. The affirmative answers only were counted. The study was repeated in several systems. It was repeated on the "big or small" basis, it took as the basis of difference a degree of failure or success, giving no credit, in some part of the objects were in proportion, or in some the infants were relatively slight. Also drawing in which only one object was represented were given no credit, the idea being that the children producing them were expected to treat a representing proportionally. This infant however is probably not serious, since at least a proportion of the pictures children drew were those of objects that are known to be that the successes and failures would have cancelled each other. Finally, there is again a large subjective element in a judgment of this character. Nevertheless, a certain interest attaches to the results, because they indicate, however imperfectly, probable growth tendencies. They are stated in Table XVI. Among the four year children, the (I.V.) show an excellent conception of proportion. When, in fact, given an outline of a house of some relationship at all. Frequently a house of three are drawn on one page, but as placed as to suggest a house they would - as if the paper had changed via some line with every object. In one of drawing proportion is not to be expected. Here the three lines of very five year old children (I.VII) have shown some sense of proportion, all three or more via four lines, one three or four lines year old, and about seven lines or more eight year old - the risk being constant by the eight years.

The boundaries are not uniform, the whole line at four and six, one line at five, seven and eight, the line at a whole revealing by .75.

Responsive to the hard explanation and most recently arrived of all the individual aspects of drawing we have to consider. While generalization perspective was known in the distant world, the applied world is actually modern. Individual during the Italian Renaissance, which developed by the genius of Leonardo da Vinci, Michael Angelo and others after. Perspective attempts to interpret in terms of two dimensional space a world of three dimensional. It portrays what the eye actually sees, rather than what it knows to be there - and that is quite contrary to natural tendency.

Attention to the practical situations of life has demanded that visual experiences be immediately perceived in terms of their real meanings as stimuli calling for practical responses. Thus, from the beginning





TABLE XXV

Continued

| Age        | Males |     | Females |     | Males |      | Females |      | Total |      | Percent |
|------------|-------|-----|---------|-----|-------|------|---------|------|-------|------|---------|
|            | A     | B   | A       | B   | A     | B    | A       | B    | A     | B    |         |
| 1          | 1     | 4   | 0       | 7   | 26    | 40   | 74      | 74   | 100   | 100  | 100.0   |
| 2          | 1     | 4   | 11      | 0   | 20    | 80   | 20      | 80   | 40    | 80   | 11.4    |
| 3          | 1     | 0   | 0       | 11  | 0     | 0    | 0       | 0    | 0     | 0    | 0.0     |
| 4          | 1     | 0   | 1       | 0   | 44    | 56   | 54      | 56   | 100   | 100  | 14.4    |
| 5          | 1     | 1   | 11      | 12  | 42    | 58   | 51      | 51   | 92    | 103  | 19.0    |
| 6          |       |     | 0       | 4   | 20    | 20   | 21      | 21   | 41    | 41   | 17.7    |
| 7          |       |     | 1       | 0   | 0     | 0    | 0       | 0    | 1     | 1    | 1.1     |
| 8          |       |     | 21      | 13  | 40    | 50   | 51      | 50   | 71    | 100  | 22.1    |
| 9          |       |     | 0       | 0   | 14    | 14   | 0       | 20   | 14    | 34   | 14.4    |
| 10         |       |     |         | 10  | 13    | 20   | 20      | 0    | 13    | 33   | 14.4    |
| 11         |       |     |         |     |       |      |         |      | 0     | 0    | 0.0     |
| 12         |       |     | 21      | 40  | 147   | 141  | 110     | 96   | 361   | 361  | 40.3    |
| 13         |       |     | 1       | 2   | 2     | 8    | 0       | 10   | 3     | 13   | 1.4     |
| 14         | 4     | 1   | 21      | 10  | 0     | 0    | 0       | 0    | 21    | 21   | 19.0    |
| 15         |       |     | 0       |     | 10    | 10   | 21      | 11   | 31    | 31   | 11.4    |
| 16         | 1     |     |         |     | 1     | 2    | 11      | 1    | 12    | 12   | 1.4     |
| 17         | 1     |     | 0       | 0   | 0     | 10   | 10      | 10   | 20    | 30   | 11.4    |
| 18         |       |     | 1       | 0   | 20    | 21   | 10      | 21   | 31    | 41   | 10.7    |
| 19         |       |     | 0       | 2   | 14    | 10   | 21      | 20   | 31    | 41   | 10.0    |
| 20         | 1     | 1   | 1       | 0   | 0     | 2    | 0       | 0    | 2     | 2    | 1.4     |
| 21         |       | 1   | 0       | 0   | 0     | 0    | 0       | 10   | 10    | 10   | 11.4    |
| 22         |       | 0   | 0       | 0   | 0     | 0    | 0       | 0    | 0     | 0    | 0.0     |
| 23         | 0     | 11  |         |     | 0     | 0    | 0       | 0    | 0     | 11   | 1.4     |
| 24         |       |     | 0       | 11  | 30    | 33   | 40      | 30   | 70    | 100  | 10.0    |
| 25         |       |     | 17      | 10  | 34    | 51   | 40      | 55   | 107   | 157  | 11.7    |
| Total      | 24    | 40  | 106     | 100 | 336   | 371  | 302     | 334  | 608   | 676  |         |
| Percent of |       |     |         |     |       |      |         |      |       |      |         |
| Population | 1.1   | 3.4 | 4.4     | 9.1 | 14.5  | 15.0 | 13.0    | 13.1 | 13.2  | 17.4 | 10.0    |
| Male       | 24    |     | 106     |     | 336   |      | 302     |      | 608   |      |         |
| Female     | 0.0   |     | 0.0     |     | 10.0  |      | 10.0    |      | 20.2  |      |         |



of life, the inverted image of the latter is, probably by fortuitous alignment, interpreted as an upright world of objects. In the same way, things in perspective, both linear and aerial, are interpreted, not as they appear, but as they are known to be. Through early and prolonged experience, the appearances, figured as appearances, become signs of meanings - of distance, and reality - or that very notion of reality, etc. are perfectly competent to point veraciously to the meanings, are totally oblivious of the signs - of perspective in any of its phases.

In the early drawings of the same it is of course the meanings that are portrayed, not the signs. It is not to be expected that the little child, not only unaware of a real world of things, but attempting to express his unmetaphorical vague but immediate image of that world, will adopt or assimilate a phase of technology as perspective.

It rather is interesting how far this assumption, accorded with the facts, the same 1887 drawings were modified for evidence of perspective. For this purpose those perspective alone was considered, aerial perspective (the indication of relative distance by gradations of tone and color) being difficult to evaluate in these drawings, structural signs as such a medium as was required. It is probable, however, that most young children are totally unconscious of such structural effects.

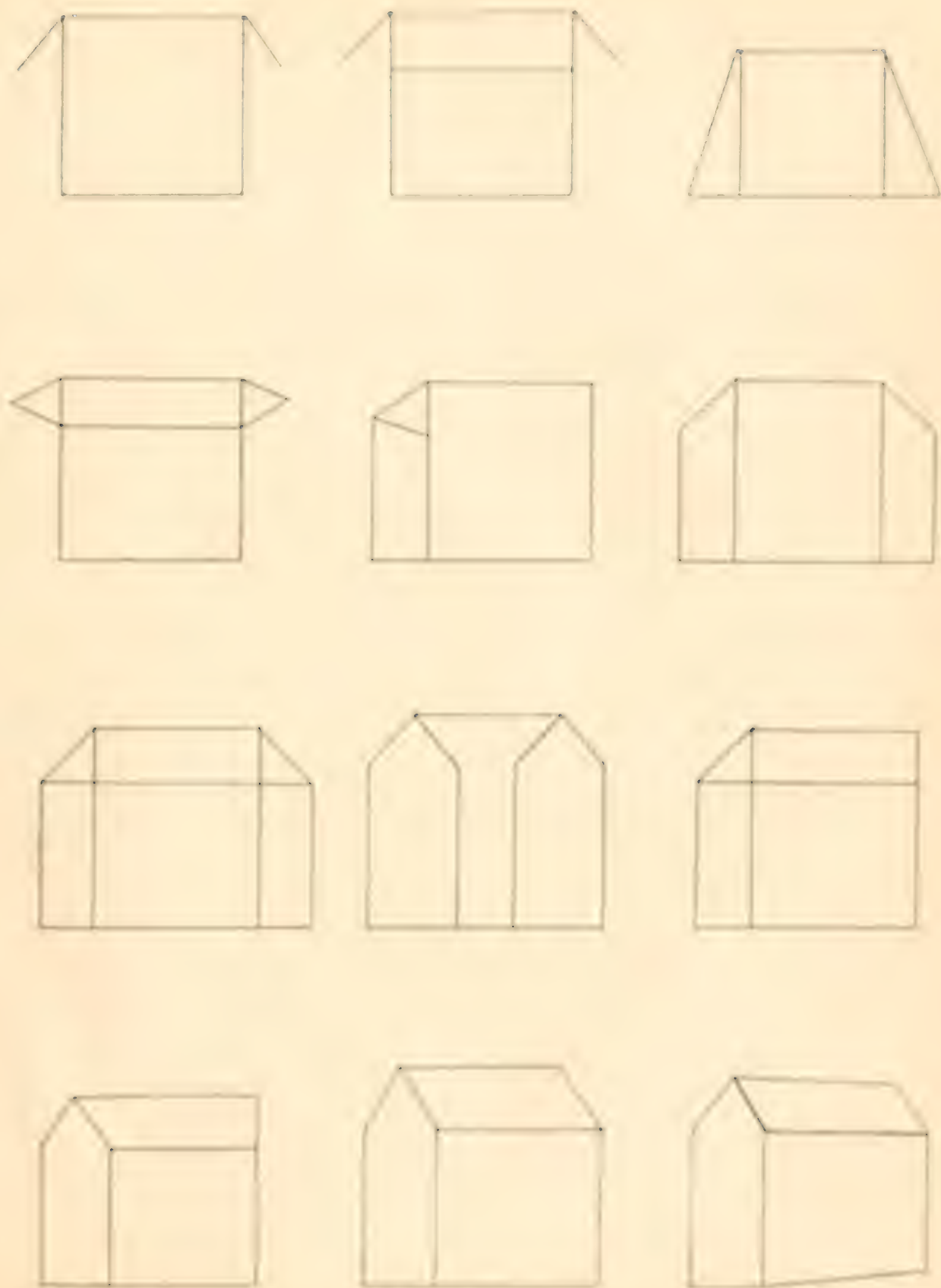
Linear perspective, when found at all, was evidenced by (i) the convergence of lines of objects receding to the distance, as, in the drawing of a road, a railroad track, or the horizontal lines of the side of a house; (ii) two-pointing, as in the lowering of the horizon between the horizontal lines representing the top of a tree, and (iii) a decrease in the relative magnitude of objects as they recede to the distance.

Instances of all three of these were found, especially in the work of the older and wiser children. The same are shown in Table VIII. It may be seen that in this group all children employed perspective in any of the phases. The curves show that each child is about three, 7 is six, 1.8 is seven, leading to 2.12 of eight years.

The last frequent occurrence is in the drawing of houses, in which the conventional form, with gable roof and two lines sloping steadily perpendicular to the vertical chimney. Now the two last may all be noted. This type was very frequently, modifying it sometimes by added height and very rare of which to include the chimney. The oval view of the house representative drawing of this form gives very definite testimony to the purely illustrative character. Figure 17 was given approximately one of the typical variations in the chimney effect in perspective with type. Of course, with the last, the chimney was being drawn in perspective, and considered as perspective drawing, on the ground that first step there really applied the rules.



Figure XV



Typical Variants in Attempts to Represent the  
Conventional House



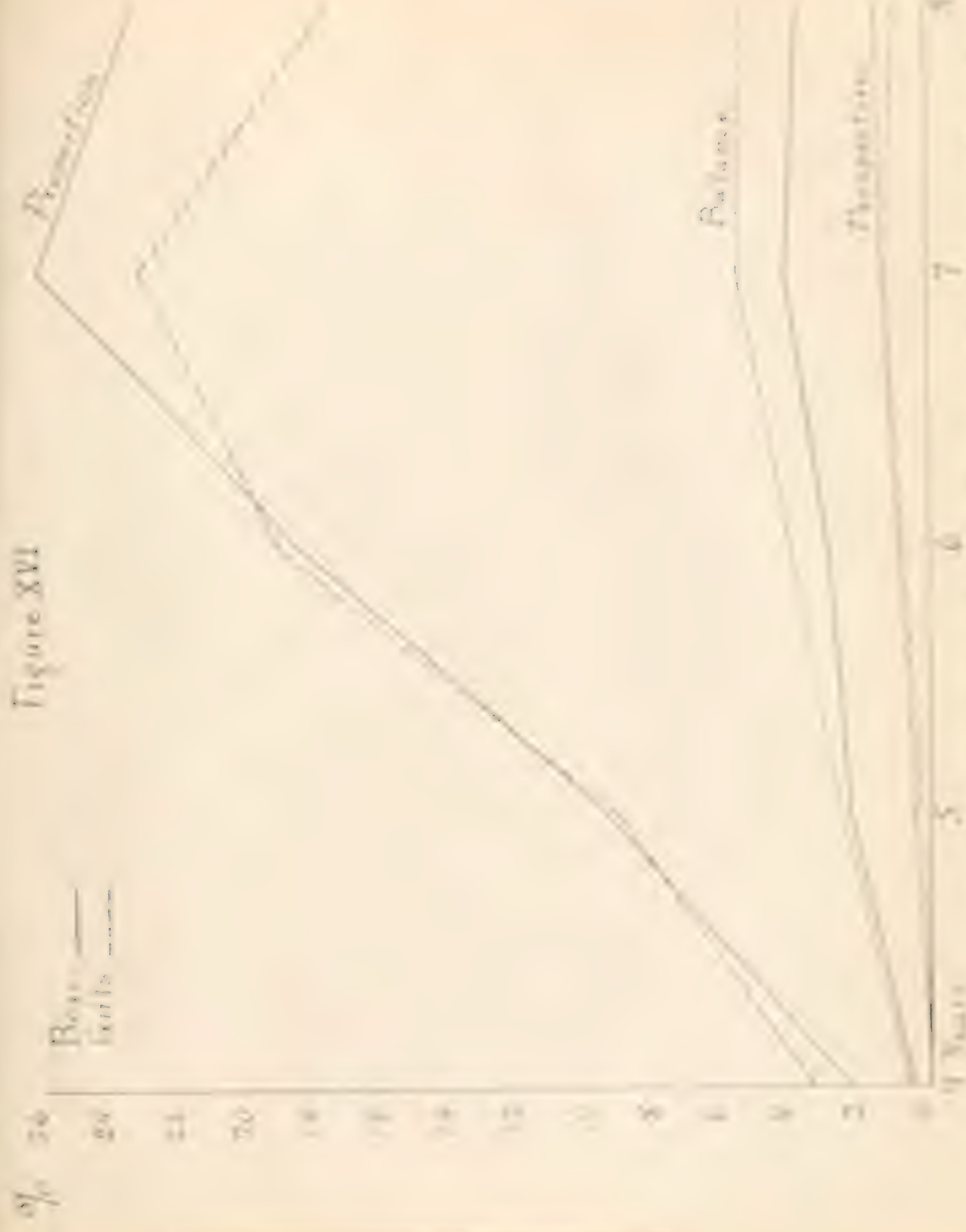


**TAB. 10 XXXV**  
**PROPORTION**

| City                  | Area |    | Area |    | Area |    | Area |     | Area |    | Total | Per-<br>cent | Total<br>Drawings |
|-----------------------|------|----|------|----|------|----|------|-----|------|----|-------|--------------|-------------------|
| A                     |      |    |      |    | 1    | 2  | 1    | 2   |      |    | 4     | .8           | 1000              |
| B                     |      |    |      |    | 1    | 2  | 1    | 2   |      | 1  | 5     | .8           | 1000              |
| C                     |      |    |      |    |      |    |      |     |      |    |       | 0.0          | 1000              |
| D                     |      |    |      |    | 1    |    |      |     | 1    |    | 2     | .1           | 1000              |
| E                     |      |    | 1    |    |      | 2  | 4    | 1   |      |    | 7     | .8           | 1000              |
| F                     |      |    |      |    |      |    | 4    | 1   |      |    | 5     | .8           | 1000              |
| G                     |      | 1  |      |    |      |    |      |     |      |    | 1     | .0           | 1000              |
| H                     |      |    | 1    |    | 1    |    |      | 2   |      | 1  | 5     | .8           | 1000              |
| I                     |      |    |      |    | 1    |    | 1    | 1   |      |    | 3     | 1.0          | 1000              |
| J                     |      |    |      |    | 1    |    | 1    |     |      |    | 2     | .8           | 1000              |
| K                     |      |    |      |    |      |    |      |     | 2    | 1  | 3     | 4.0          | 1000              |
| L                     |      | 1  | 1    |    | 1    | 2  | 5    | 14  |      |    | 24    | 1.0          | 1000              |
| M                     |      |    |      |    |      |    |      |     |      |    |       | 0.0          | 1000              |
| N                     |      | 1  | 1    |    | 1    | 2  |      | 1   | 1    | 2  | 7     | 1.4          | 1000              |
| O                     |      |    |      |    |      | 1  |      | 1   |      |    | 2     | .1           | 1000              |
| P                     |      |    |      |    |      |    |      |     |      |    |       | 0.0          | 1000              |
| Q                     |      |    |      |    | 2    |    | 2    |     | 1    | 1  | 6     | 1.4          | 1000              |
| R                     |      |    |      |    | 2    | 4  | 4    | 1   |      |    | 11    | 2.0          | 1000              |
| S                     |      |    |      |    | 2    | 1  | 4    | 2   | 1    | 1  | 10    | .8           | 1000              |
| T                     |      | 1  |      |    |      |    |      |     |      |    | 1     | .8           | 1000              |
| U                     |      |    |      |    |      |    |      |     |      |    |       | 0.0          | 1000              |
| V                     |      |    |      |    |      |    |      |     |      |    |       | 0.0          | 1000              |
| W                     |      |    |      |    |      |    |      |     |      |    |       | 0.0          | 1000              |
| X                     |      |    |      |    |      |    |      |     |      |    |       | 0.0          | 1000              |
| Y                     |      | 1  |      |    | 1    |    | 1    | 1   | 1    | 1  | 5     | .8           | 1000              |
| Z                     |      | 1  |      |    | 1    | 3  | 2    | 5   |      |    | 12    | .8           | 1000              |
| Total                 |      | 7  | 4    |    | 27   | 21 | 31   | 34  | 11   | 7  | 138   | .7           | 1000              |
| Number of<br>Drawings |      |    |      |    |      |    |      |     |      |    |       |              |                   |
| Percent               | 0    | 0  | .4   | .1 | .8   | .7 | 1.3  | 1.3 | 1.4  | .8 |       | .7           |                   |
| 0 & 9                 |      | 11 |      |    | 44   |    | 46   |     | 11   |    |       |              |                   |
| Percent               | 0    | .8 |      |    | .7   |    | 1.4  |     | 1.1  |    |       |              |                   |



Figure XVI



Comparison of Errors and Ages in Use of Proportion, Balance, and Assumption





Other instances of perspective are found in the drawing of buildings, especially in the interesting case of picture windows and the perspective lines of roof and floor as they recede into the distance.

It is well to remember, however, that at every age, even where perspective is at all, the boys exceed the girls. Girls draw also well, especially in the 8, 9, 10, while the others, well represented in the drawing material, are totally lacking in perspective work.

Several interesting studies of perspective in children's drawings have been made before. Korachonstetter (1906) in his elaborate study of the drawings of Munich school children found that perspective appeared rarely in the eighth year in boys, developing slowly until at 10, 50 % of boys have a significant sense of perspective, although perfect representation of spacial relations was seen in only from two to four percent of the work of boys before the age of fourteen, and hardly ever in the work of girls. The drawings of the earlier years (his study begins at six) are almost wholly "schematic", showing only two-dimensional space, and picturing objects by the most significant features known to be there without regard to appearances or esthetic values. His definite investigation of perspective therefore is confined to the years from eight to fourteen.

Clark (1897) experimented with 408 school children, ranging in age from 6 to 16 years, by asking them to draw from the object, an apple pierced through by a hat pin. He found that 98% of the six year children drew the hat pin clear across the apple; 40% of the nine year children did the same, 40 % drew the pin to the circumference of the apple, while 20% represented it as it actually appeared. There is an abrupt drop in the more primitive form at the years corresponding somewhat with Korachonstetter's results.

Oshea (1898) set before children from five to seventeen years of age the problem of drawing a chair or table from the model. With few exceptions the results from the earlier years were in two dimensional space, with no evidence of any consciousness of linear perspective. It seems safe to conclude that this phase of technique has no place in the early period of school life, and that such signs as do appear are at least in large measure the result of imitation of conventional forms, without clear consciousness of their meaning.







The investigation has been conducted in the most thorough manner possible. It has been found that the majority of the cases of this disease are due to a specific cause, and that the disease is highly contagious. It is therefore imperative that the public be educated as to the nature of the disease and the steps that should be taken to prevent its spread. The following are the results of the investigation:

1. The disease is caused by a specific microbe which is highly contagious.

2. The disease is spread by direct contact with the infected person or by contact with the secretions of the infected person.

3. The disease is spread by contact with the secretions of the infected person.

4. The disease is spread by contact with the secretions of the infected person.

5. The disease is spread by contact with the secretions of the infected person.

6. The disease is spread by contact with the secretions of the infected person.

7. The disease is spread by contact with the secretions of the infected person.

8. The disease is spread by contact with the secretions of the infected person.

9. The disease is spread by contact with the secretions of the infected person.

10. The disease is spread by contact with the secretions of the infected person.

The following are the steps that should be taken to prevent the spread of the disease:

1. Isolation of the infected person.

2. Disinfection of the secretions of the infected person.

3. Disinfection of the secretions of the infected person.

4. Disinfection of the secretions of the infected person.

5. Disinfection of the secretions of the infected person.

6. Disinfection of the secretions of the infected person.

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of drawing, due to over-enthusiasm of children's freedom and individual initiative. Success must in their results.

The defense of drawing is necessary. Its value as a means of self-expression, of systematic observation, of defining and classifying similar things, and of leading on to appreciations of nature and art is universally acknowledged. Its place in the kindergarten primary period is particularly vital, because of the insatiable interest in drawing itself and the social need for the cultivation of just these values for which it stands.

Drawing has now compared to language, a language peculiarly adapted to the expression of visual images. Drawing the analogy forward we may say that no language develops in a vacuum. The first requisite is social exposure to the language of others; the second is a fund of ideas to express, the third is again social situations stimulating to expression. Certainly these same conditions are fundamental to drawing; imitating others first, and seeing the products of others' drawing is probably just as essential as hearing speech is to social language. Something to express with range of interesting experiences through sensory contact with real things primarily, through literature, oral language, and pictures secondarily, is equally important. Motivation - the stimulus of an occasional suggestion to draw, and that to draw, with worth while purposes held up to view - , satisfactions for work well done, and judicious criticism at the right moment, are surely in harmony with the new pedagogy.

On the other hand, guidance becomes dangerous if it is imposed at the cost of diminished spontaneity and initiative. To elicit the educational draft so as to avoid the evils of a spontaneity barren of results in growing power of expression, and the sharpshins of the suppression of self-trust and initiative. More arbitrary and premature imposition of adult standards - this is the test of artistry in teaching.

Concerning the scales, it must be said that they are in no wise offered as the last word on the subject. All of them are imperfect, and may be improved upon in many ways. The composition scale should probably be supplemented. Other scales, representative of children's drawing of other subjects - for example, animals and vehicles, and also of their abilities in other forms of manual arts, should be constructed. The norms derived from the present study will probably be modified considerably by the inclusion of much greater numbers of samples.

Regarding the use of the scales, it must be emphasized that they should never become models, as the handwriting scales have been tentatively used, for drawing instruction. Nothing could be further from their intention. It is hoped that they will be of service both to individual teachers and to administrators in the kindergarten primary field, in the assessment of results, though methods must always be determined, not by results, but by sincere adherence to sound principles. Further use of the scales may be made in measuring the differences between kindergarten and non-kindergarten children, and, perhaps, in giving a decisive answer to the question frequently propounded, but





never satisfactorily answered, Do children of these ages draw from the model, or exclusively from their own mental images? Other uses will doubtless appear in the future. *P* Finally it must be stressed that, despite the frequent allusion to scales as "measuring rods", analogous to the foot rule or the theodolite, experience with other product scales has proven that there is a far larger subjective element in their use. Hence definite training and practice are necessary before any individual can employ them with a high degree of accuracy; and, at best, there will always be variations in individual ratings. It can only be said that the amount of variation should be considerably less with the scales than without them, and that their employment offers opportunities for comparative studies otherwise impossible.



## TABLE III.

| Human Beings            | B. 5 |    | B. 6 |    | B. 7 |    | B. 8 |    | Total |    | Grand Total |    |     |    |
|-------------------------|------|----|------|----|------|----|------|----|-------|----|-------------|----|-----|----|
|                         | B.   | G. | B.   | G. | B.   | G. | B.   | G. | B.    | G. |             |    |     |    |
| Abraham Lincoln         |      |    |      | 1  |      | 1  |      |    | 2     |    | 2           |    |     |    |
| Angel                   |      |    | 1    |    |      |    |      | 1  | 3     |    | 3           |    |     |    |
| Baker                   |      |    |      | 1  | 1    |    |      |    | 1     | 1  | 2           |    |     |    |
| Balloon Man             |      |    |      | 1  |      |    |      | 1  |       |    | 2           |    |     |    |
| Black Sambo             |      |    |      |    |      |    |      |    | 2     |    | 2           |    |     |    |
| Bogey Man               |      | 2  |      |    |      |    |      |    |       | 2  | 2           |    |     |    |
| Boy Scout               |      |    |      |    |      |    |      | 1  | 1     |    | 1           |    |     |    |
| Brownie (goblin)        | 3    |    | 4    | 3  | 5    | 6  | 2    | 1  | 1     | 15 | 11          | 26 |     |    |
| Carpenter               |      |    | 1    | 1  | 2    |    |      |    | 3     | 1  | 3           |    |     |    |
| Charlie Chaplin         | 1    |    | 5    | 3  | 3    | 2  | 1    | 2  |       | 16 | 7           | 23 |     |    |
| Chinaman                | 1    |    |      |    | 1    |    |      |    | 2     | 1  | 3           |    |     |    |
| Clock faced boy         |      |    |      |    |      |    | 1    |    |       | 1  | 1           |    |     |    |
| Clown                   |      |    | 7    | 5  | 3    | 4  | 3    | 1  | 1     | 18 | 9           | 27 |     |    |
| Conductor               |      |    |      |    | 1    |    |      |    | 1     |    | 1           |    |     |    |
| Cowboy                  |      |    | 4    |    | 1    | 1  | 6    | 1  | 3     | 1  | 21          | 3  | 24  |    |
| Dancing girls           |      |    |      |    |      |    | 1    |    |       |    | 1           | 1  |     |    |
| Devil                   |      |    |      | 1  |      |    |      | 1  | 1     | 1  | 2           |    |     |    |
| Doctor                  |      |    |      |    |      |    |      |    | 1     | 1  | 1           |    |     |    |
| Dog catcher             |      |    |      |    | 2    |    |      |    | 2     |    | 2           |    |     |    |
| Dwarf                   | 1    |    |      |    |      |    | 1    |    | 2     |    | 2           |    |     |    |
| Eskimo                  |      |    |      |    | 2    | 1  | 4    |    | 2     | 2  | 8           | 3  | 11  |    |
| Fairy                   |      |    |      |    | 1    | 3  |      | 1  |       | 1  | 4           | 3  |     |    |
| Farmer                  |      |    | 5    | 1  |      |    | 2    |    |       | 5  | 1           | 6  |     |    |
| Fatty Arbuckle          |      |    |      |    | 2    |    |      |    | 2     |    | 2           |    |     |    |
| Fireman                 |      |    | 1    |    | 2    |    |      |    | 3     |    | 3           |    |     |    |
| Funny man               | 1    | 1  |      |    |      |    |      |    | 1     | 1  | 2           |    |     |    |
| Geo. Washington         |      |    |      |    | 5    | 3  | 3    |    | 8     | 3  | 11          |    |     |    |
| German                  | 1    |    |      |    |      |    |      |    | 1     |    | 1           |    |     |    |
| Giant                   |      |    | 1    |    |      |    |      |    | 1     |    | 1           |    |     |    |
| Gingerbread Boy         |      |    | 2    | 1  |      |    | 1    | 1  | 3     | 2  | 5           |    |     |    |
| God                     |      | 1  |      | 1  |      |    |      |    | 2     |    | 4           |    |     |    |
| Grandmother             |      |    |      | 1  |      |    |      |    |       | 1  | 1           |    |     |    |
| Hans                    |      |    |      |    |      |    | 1    |    | 1     |    | 1           |    |     |    |
| Happy Hooligan          |      |    | 2    |    |      |    |      |    | 2     |    | 2           |    |     |    |
| Humpty Dumpty           | 2    | 2  | 10   | 3  | 7    | 2  | 1    |    | 20    | 10 | 30          |    |     |    |
| Hunter                  |      |    |      | 1  |      |    |      | 1  |       |    | 1           |    |     |    |
| Ice Man                 |      |    |      | 1  |      |    |      |    |       |    | 1           |    |     |    |
| Indian                  | 3    | 2  | 23   | 12 | 31   | 25 | 78   | 36 | 21    | 15 | 156         | 90 | 246 |    |
| Jack Frost              |      |    |      |    |      | 1  |      |    |       |    | 1           | 1  |     |    |
| Japanese                |      |    |      |    |      | 1  |      | 1  |       |    | 2           | 2  |     |    |
| Kaiser                  |      |    |      |    | 5    | 1  | 8    |    |       | 13 | 17          | 14 |     |    |
| King                    |      |    | 2    |    |      |    |      |    | 1     | 2  | 3           | 2  | 5   |    |
| Man in Moon             | 1    |    | 1    |    |      |    |      |    |       | 2  |             | 2  |     |    |
| Mother Goose Characters |      | 3  | 15   | 15 | 13   | 17 | 4    | 7  | 3     | 4  | 41          | 46 | 87  |    |
| Motor Man               |      |    | 1    |    |      |    |      |    |       | 1  |             | 1  |     |    |
| Mutt and Jeff           |      | 1  |      |    |      |    |      |    |       |    | 1           | 1  |     |    |
| Negro                   |      |    |      |    |      |    |      | 1  |       | 1  |             | 1  |     |    |
| North Wind              |      |    |      |    |      | 9  | 7    | 10 | 11    | 5  | 3           | 24 | 21  | 45 |
| Pilgrims                |      |    |      |    | 4    | 1  | 1    |    | 2     |    | 8           | 1  | 9   |    |
| Policeman               |      |    | 1    |    |      |    |      |    |       |    | 1           | 1  |     |    |
| Punch and Judy          |      |    |      |    | 1    |    |      |    |       |    |             | 1  | 1   |    |
| Puritan                 |      |    |      |    |      |    |      |    |       | 1  |             | 1  |     |    |





|                 | 4. |    | 5. |    | 6(2) |    | 7. |    | 8. |    | Total |    | Grand |
|-----------------|----|----|----|----|------|----|----|----|----|----|-------|----|-------|
|                 | B. | G. | B. | G. | B.   | G. | B. | G. | B. | G. | B.    | G. | Total |
| Raggedy Ann     |    |    |    |    | 1    |    | 1  |    |    |    | 2     | 1  | 3     |
| Red Riding Hood |    |    | 1  |    |      | 1  |    | 2  |    |    | 1     | 3  | 4     |
| Robber          |    |    | 1  |    |      |    | 2  |    |    |    | 3     |    | 3     |
| Sailor          |    |    | 4  | 3  | 3    | 2  | 8  | 4  |    |    | 15    | 9  | 24    |
| Sand Man        |    |    | 1  |    |      |    |    |    |    |    | 1     |    | 1     |
| Sandy Andy      |    |    | 3  |    |      |    |    |    |    |    | 3     |    | 3     |
| Santa Claus     | 11 | 7  | 36 | 32 | 32   | 21 | 30 | 14 | 4  | 4  | 113   | 68 | 181   |
| Scare Crow      |    |    | 4  | 1  | 3    | 3  | 1  |    |    |    | 8     | 4  | 12    |
| Silver Looks    |    |    |    | 3  |      | 1  | 1  | 1  |    |    | 1     | 5  | 6     |
| Snow Man        | 4  | 3  | 8  | 4  | 13   | 6  | 8  | 3  | 1  | 3  | 34    | 19 | 53    |
| Soldier         | 4  | 1  | 12 | 8  | 26   | 7  | 32 | 6  | 12 | 4  | 28    | 26 | 112   |
| Sun Bonnet      |    |    |    |    |      |    |    |    |    |    |       |    |       |
| Babies          |    |    |    |    |      |    | 1  |    |    |    |       | 1  | 1     |
| Tom Thumb       |    |    | 1  |    |      |    |    |    |    |    | 1     |    | 1     |
| Uncle Sam       |    |    |    |    |      |    | 3  |    |    |    | 3     |    | 3     |
| Witch           | 1  |    | 3  | 2  | 3    | 4  | 7  | 6  | 3  |    | 17    | 12 | 29    |

Total Special Characters 36 23 153 94 210 122 219 103 64 44 685 386 1071

Babies 20 57 45 108 32 63 18 45 1 5 116 278 394

Children 85 200 417 751 761 1127 727 935 123 1342 112 3147 5359

Adults 1337 3331 316 796 357 372 729 525 171 1163 330 2420 5750

Total People 128 3152 2341 7251 9601 984 16951 608 358 2986 245 6231 12474

|                   | 4. |    | 5.  |     | 6.  |     | 7.  |     | 8. |    | Total |     | Grand |
|-------------------|----|----|-----|-----|-----|-----|-----|-----|----|----|-------|-----|-------|
| Domestic Animals. | B. | G. | B.  | G.  | B.  | G.  | B.  | G.  | B. | G. | B.    | G.  | Total |
| Calf              |    | 1  |     |     |     |     |     |     |    |    |       | 1   | 1     |
| Camel             | 3  |    | 9   | 3   | 7   | 4   | 10  | 5   | 2  | 1  | 31    | 13  | 44    |
| Cat               | 11 | 23 | 31  | 51  | 80  | 127 | 80  | 154 | 16 | 20 | 218   | 375 | 593   |
| Cow               | 8  | 5  | 16  | 8   | 15  | 11  | 12  | 7   | 1  | 1  | 50    | 32  | 82    |
| Dog               | 12 | 20 | 36  | 31  | 73  | 59  | 81  | 61  | 25 | 14 | 227   | 185 | 412   |
| Donkey            | 2  | 1  | 3   |     | 3   |     | 6   |     | 3  | 2  | 14    | 3   | 17    |
| Goat              | 1  |    | 2   | 1   | 6   | 1   | 16  | 5   | 1  |    | 26    | 7   | 33    |
| Guinea Pig        |    |    |     | 1   |     | 1   |     |     |    |    |       | 2   | 2     |
| Horse             | 24 | 24 | 56  | 50  | 102 | 47  | 151 | 52  | 29 | 16 | 362   | 189 | 551   |
| Ox                |    |    |     |     |     |     | 1   |     |    |    |       | 1   | 1     |
| Pig               | 9  | 11 | 19  | 9   | 23  | 11  | 29  | 27  | 3  | 1  | 82    | 59  | 141   |
| Pony              |    | 1  | 1   |     | 2   |     |     |     |    |    | 3     | 1   | 4     |
| Reindeer          | 5  |    | 9   | 2   | 15  | 4   | 18  | 7   | 1  | 3  | 46    | 16  | 62    |
| Sheep or Lamb     | 1  |    | 2   |     | 4   | 8   | 5   | 4   | 2  |    | 14    | 12  | 26    |
| Total             | 73 | 88 | 181 | 156 | 329 | 273 | 408 | 323 | 83 | 58 | 1073  | 896 | 1969  |



|                     | 4.  |     | 5.  |     | 6.  |     | 7.  |     | 8.  |     | Total |      | Grand<br>Total |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|------|----------------|
|                     | B.  | G.  | B.  | G.  | B.  | G.  | B.  | G.  | B.  | G.  | B.    | G.   |                |
| <u>Wild Animals</u> |     |     |     |     |     |     |     |     |     |     |       |      |                |
| Alligator           |     |     |     |     | 1   |     | 2   |     |     |     | 3     |      | 3              |
| Ant Eater           |     |     |     |     |     |     |     | 1   |     |     |       | 1    | 1              |
| Bat                 |     |     | 1   |     |     |     |     |     | 1   |     | 2     |      | 2              |
| Bear                | 2   | 5   | 17  | 16  | 15  | 22  | 32  | 19  | 3   | 6   | 69    | 68   | 137            |
| Bison               |     |     |     |     |     |     | 7   | 5   |     |     | 7     | 5    | 12             |
| Crab                |     | 2   |     |     | 2   |     |     |     |     |     | 2     | 2    | 4              |
| Elephant            | 5   | 1   | 10  | 2   | 13  | 5   | 19  | 8   | 5   | 3   | 52    | 19   | 71             |
| Fish                | 12  | 4   | 31  | 21  | 12  | 13  | 17  | 11  | 6   | 3   | 75    | 12   | 127            |
| Fox                 | 1   |     | 2   |     | 5   | 1   | 11  | 6   | 4   | 2   | 23    | 9    | 32             |
| Frog                | 5   | 3   | 5   | 2   |     | 1   |     |     |     |     | 10    | 6    | 16             |
| Giraffe             |     |     |     | 1   | 1   | 1   | 2   |     | 2   |     | 5     | 2    | 7              |
| Gorilla             |     |     |     |     |     |     | 1   |     |     |     | 1     |      | 1              |
| Hippopotamus        |     |     | 3   |     |     |     |     |     |     |     | 6     |      | 6              |
| Jackal              |     |     |     |     |     |     |     |     | 1   |     | 1     |      | 1              |
| Lion                | 1   | 1   | 6   |     | 5   |     | 2   | 2   | 1   |     | 15    | 3    | 18             |
| Lobster             |     |     |     |     | 1   |     |     |     |     |     | 1     |      | 1              |
| Monkey              | 5   | 13  | 22  | 22  | 22  | 10  | 11  | 5   | 1   |     | 69    | 57   | 122            |
| Mouse               | 2   |     | 9   | 6   | 4   | 4   | 2   | 5   | 1   | 1   | 18    | 16   | 34             |
| Rabbit              | 13  | 13  | 24  | 22  | 44  | 22  | 72  | 40  | 12  | 17  | 173   | 127  | 300            |
| Rat                 | 3   | 3   | 4   | 3   | 2   | 4   | 4   | 5   | 3   | 2   | 16    | 17   | 33             |
| Rhinoceros          |     |     | 1   |     |     |     |     |     |     |     | 1     |      | 1              |
| Seal                |     |     |     |     |     | 1   |     |     |     |     |       | 1    | 1              |
| Snail               | 3   | 3   | 3   | 1   |     |     |     |     |     |     | 6     | 4    | 10             |
| Snake               | 5   | 1   | 13  | 4   | 8   | 4   |     |     | 1   |     | 27    | 9    | 33             |
| Squirrel            | 3   | 1   | 10  | 6   | 6   | 5   | 11  | 9   | 1   | 8   | 31    | 29   | 30             |
| Tiger               | 1   |     |     | 2   |     |     |     |     | 1   |     | 2     | 2    | 4              |
| Toad                |     |     |     |     | 1   |     |     | 1   |     |     | 1     | 1    | 2              |
| Turtle              | 1   |     | 2   |     |     |     | 4   | 2   | 1   | 2   | 8     | 4    | 12             |
| Wild Cat            |     |     | 1   |     |     |     |     |     |     |     | 1     |      | 1              |
| Wolf                | 1   |     |     |     | 1   | 1   | 1   | 5   | 2   |     | 5     | 6    | 11             |
| Zebra               |     |     |     |     |     |     |     | 1   |     |     |       | 1    | 1              |
| Total W. Animals    | 30  | 33  | 131 | 118 | 155 | 100 | 202 | 125 | 53  | 44  | 631   | 440  | 1071           |
| Total D. Animals    | 72  | 23  | 131 | 152 | 322 | 273 | 408 | 323 | 83  | 56  | 1073  | 692  | 1969           |
| Total Animals       | 132 | 136 | 342 | 274 | 484 | 373 | 610 | 448 | 136 | 102 | 1704  | 1338 | 3040           |

|                       |    |    |    |    |    |    |    |    |    |    |     |     |     |
|-----------------------|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|
| <u>Domestic Birds</u> |    |    |    |    |    |    |    |    |    |    |     |     |     |
| Chicken               | 14 | 9  | 28 | 21 | 41 | 32 | 42 | 35 | 15 | 13 | 140 | 110 | 250 |
| Duck                  | 7  | 10 | 17 | 10 | 12 | 8  | 9  | 14 | 5  | 1  | 50  | 43  | 93  |
| Geese                 | 1  |    | 2  |    | 3  | 2  | 1  | 1  |    |    | 7   | 3   | 10  |
| Parrot                |    |    | 1  | 1  |    |    | 3  |    |    |    | 4   | 1   | 5   |
| Peacock               |    |    |    |    |    |    | 1  |    |    |    | 1   |     | 1   |
| Pigeon                | 1  | 1  | 10 | 9  | 13 | 3  |    |    | 1  |    | 28  | 13  | 41  |
| Rooster               |    |    | 1  | 1  | 1  |    |    |    |    |    | 2   | 1   | 3   |
| Turkey                | 1  | 2  | 8  | 8  | 15 | 7  | 22 | 17 | 4  | 3  | 50  | 37  | 87  |
| Total                 | 24 | 22 | 67 | 50 | 88 | 52 | 78 | 67 | 25 | 17 | 282 | 208 | 490 |





|                   | 4  |    | 5   |    | 6   |     | 7   |     | 8  |     | Total |     | Grand Total |
|-------------------|----|----|-----|----|-----|-----|-----|-----|----|-----|-------|-----|-------------|
| Wild Birds        | B. | G. | B.  | G. | B.  | G.  | B.  | G.  | B. | G.  | B.    | G.  |             |
| Black bird        |    |    |     |    | 2   | 2   | 3   | 3   | 2  | 3   | 7     | 8   | 15          |
| Blue bird         | 2  |    |     | 1  | 2   | 1   |     | 4   |    | 1   | 4     | 7   | 11          |
| Buzzard           |    |    |     | 1  |     |     | 1   |     |    |     | 1     | 1   | 2           |
| Chickadee         |    |    |     | 1  |     | 1   |     |     |    |     |       | 2   | 2           |
| Crow              |    |    |     |    |     | 1   |     |     |    |     |       | 1   | 2           |
| Eagle             | 1  |    |     | 2  |     |     |     | 1   | 2  | 1   | 3     | 4   | 7           |
| Hawk              |    |    | 1   |    | 1   |     | 1   |     |    |     | 3     |     | 3           |
| Kingfisher        |    |    |     |    |     |     |     | 1   |    |     |       | 1   | 1           |
| Ostrich           |    |    |     |    | 1   |     |     |     |    |     | 1     |     | 1           |
| Owl               |    |    | 5   | 1  | 10  | 3   | 12  | 5   | 1  | 5   | 28    | 14  | 42          |
| Robin             |    | 1  | 4   | 4  | 4   | 3   | 1   | 1   |    | 3   | 9     | 12  | 21          |
| Sandpiper         |    |    |     |    |     |     |     |     |    | 1   |       | 1   | 1           |
| Sparrow           |    |    |     |    | 1   |     |     | 1   |    |     | 1     | 2   | 2           |
| Stork             |    |    |     |    |     |     | 1   |     |    |     | 1     |     | 1           |
| Thrush            |    |    |     |    |     |     |     | 1   |    |     |       | 1   | 1           |
| Woodpecker        |    |    |     |    | 1   | 2   | 1   |     | 1  |     | 3     | 2   | 5           |
| Total Specif.     | 3  | 1  | 11  | 10 | 23  | 13  | 20  | 18  | 7  | 14  | 65    | 56  | 120         |
| Total Unspec.     | 22 | 23 | 90  | 89 | 156 | 155 | 198 | 227 | 72 | 103 | 537   | 597 | 1135        |
| Total Wild Birds. | 25 | 24 | 101 | 99 | 179 | 168 | 218 | 245 | 79 | 117 | 602   | 653 | 1255        |

| Insects.            |    |    |    |    |    |    |    |    |   |   |     |     |     |
|---------------------|----|----|----|----|----|----|----|----|---|---|-----|-----|-----|
| Ant                 | 1  |    |    |    | 1  |    |    |    |   |   | 1   | 1   | 2   |
| Bee                 | 6  | 1  | 2  | 1  | 2  | 3  | 2  | 2  |   | 1 | 13  | 8   | 21  |
| "Bug"               | 1  | 2  | 3  | 4  |    | 1  |    |    |   |   | 4   | 7   | 11  |
| Butterfly           | 2  | 3  | 18 | 13 | 7  | 17 | 4  | 20 |   | 6 | 31  | 59  | 90  |
| Cocoon              |    |    |    |    | 3  | 3  | 1  | 1  |   |   | 4   | 4   | 8   |
| Firefly             |    |    | 1  |    |    |    | 1  |    |   |   | 2   |     | 2   |
| Fly                 | 1  |    |    | 2  | 1  | 2  |    |    |   |   | 2   | 4   | 6   |
| Grasshopper         |    |    | 1  |    |    |    | 1  | 2  |   |   | 3   | 2   | 4   |
| Ladybug             |    |    |    |    |    |    | 1  |    |   |   | 1   |     | 1   |
| Mosquito            |    |    |    |    |    |    |    |    | 1 |   |     | 1   | 1   |
| Pinch bug           |    |    |    |    |    | 1  |    |    |   |   |     | 1   | 1   |
| Roach               |    |    | 1  |    |    | 1  |    | 1  |   |   | 1   | 2   | 3   |
| Spider              | 8  | 8  | 18 | 15 | 8  | 12 | 1  | 3  | 1 |   | 36  | 38  | 74  |
| Thousand Leg        |    |    | 1  | 1  |    |    |    |    |   |   | 1   | 1   | 2   |
| Worm or Caterpillar | 2  | 4  | 3  | 1  | 1  | 2  |    |    | 1 | 1 | 7   | 8   | 15  |
| Total               | 20 | 19 | 48 | 37 | 23 | 42 | 13 | 29 | 2 | 9 | 105 | 136 | 241 |

| Trees.        |     |     |     |     |      |      |      |      |     |     |      |      |      |
|---------------|-----|-----|-----|-----|------|------|------|------|-----|-----|------|------|------|
| Apple         |     |     |     |     | 1    | 3    | 5    | 1    |     | 3   | 6    | 7    | 13   |
| Cherry        |     |     |     |     |      |      | 3    |      |     |     | 3    |      | 3    |
| Christmas     | 1   | 2   | 4   | 5   | 2    | 9    | 1    | 5    |     |     | 8    | 21   | 29   |
| Date Palm     |     |     |     |     |      | 1    |      |      |     |     |      | 1    | 1    |
| Maple         |     |     |     |     |      | 1    |      |      |     |     |      | 1    | 1    |
| Trees-Generic |     |     |     |     |      |      |      |      | 311 | 303 |      |      |      |
|               | 106 | 127 | 621 | 756 | 1048 | 1225 | 1068 | 1392 | 311 | 306 | 3154 | 3803 | 6957 |
| Total         | 107 | 129 | 625 | 761 | 1051 | 1239 | 1077 | 1398 | 311 | 306 | 3171 | 3833 | 7004 |





(5)

| Flowers.      | 4  |    | 5   |     | 6   |     | 7   |     | 8  |     | Total |      | Grand<br>Total |
|---------------|----|----|-----|-----|-----|-----|-----|-----|----|-----|-------|------|----------------|
| Specified.    | B. | G. | B.  | G.  | B.  | G.  | B.  | G.  | B. | G.  | B.    | G.   |                |
| Apple Blossom |    |    |     |     |     |     | 1   |     |    |     | 1     |      | 1              |
| Aster         |    |    |     |     |     | 1   |     |     |    |     |       | 1    | 1              |
| Buds          | 1  |    |     |     |     |     |     |     |    |     | 1     |      | 1              |
| Bulbs         |    |    |     |     |     |     |     | 1   |    |     |       | 1    | 1              |
| Buttercup     |    |    |     | 2   | 2   | 2   |     |     |    |     | 2     | 4    | 6              |
| California    | 1  |    |     | 1   |     |     |     |     |    |     |       | 1    | 1              |
| Cat-tail      |    |    | 1   |     |     |     |     |     |    |     | 1     |      | 1              |
| Clover        |    |    |     |     |     |     |     |     |    |     |       | 3    | 3              |
| Cosmos        |    |    |     |     |     |     |     |     |    |     |       | 1    | 1              |
| Daffodil      |    |    |     |     |     |     |     |     |    |     |       | 1    | 1              |
| Daisy         | 2  | 1  | 3   | 8   | 7   | 2   | 5   | 23  |    |     | 15    | 63   | 78             |
| Dandelion     |    | 1  |     | 2   | 5   | 3   |     | 4   |    |     | 6     | 10   | 16             |
| Fern          |    |    |     |     |     |     |     |     |    | 3   |       | 3    | 3              |
| Geranium      |    |    |     |     |     |     |     | 1   |    |     |       | 3    | 3              |
| Holly         |    |    |     |     | 1   |     | 1   |     |    |     | 2     |      | 2              |
| Hollyhock     |    |    | 1   |     |     |     |     |     |    |     | 1     |      | 1              |
| Hyacinthe     |    |    |     |     |     |     |     | 1   |    |     |       | 1    | 1              |
| Iris          |    |    |     |     |     |     |     | 1   |    |     |       | 1    | 1              |
| Lily          |    |    |     |     |     |     |     | 1   |    |     |       | 1    | 1              |
| Marigold      |    |    |     |     |     |     |     |     | 1  |     |       | 1    | 1              |
| Narcissus     |    |    |     |     |     |     |     | 1   |    |     |       | 1    | 1              |
| Pansy         |    |    |     | 1   | 1   |     |     | 1   |    |     | 1     | 2    | 3              |
| Peony         | 1  |    |     |     |     |     |     |     |    | 1   | 1     | 1    | 2              |
| Pussy-willow  |    |    | 2   | 2   | 5   | 18  | 4   | 5   | 3  | 3   | 14    | 33   | 46             |
| Rose          |    |    | 2   | 18  | 5   | 18  | 8   | 12  | 1  | 3   | 24    | 56   | 80             |
| Rosebush      |    |    | 2   | 1   |     |     |     |     |    | 1   | 2     | 3    | 4              |
| Rubber plant  |    |    |     |     |     |     |     |     |    | 1   |       | 1    | 1              |
| Sunflower     |    | 2  | 2   | 11  | 4   | 7   | 2   | 8   | 3  | 3   | 31    | 39   | 67             |
| Sunflower     |    | 2  | 2   | 11  | 4   | 7   | 2   | 8   |    | 3   | 8     | 31   | 39             |
| Tulip         |    | 1  | 2   | 5   | 6   | 12  | 2   | 24  | 1  | 1   | 11    | 43   | 54             |
| Violet        |    |    |     | 1   |     | 1   |     | 2   |    |     |       | 4    | 4              |
| Waterlily     |    |    |     | 1   |     | 1   | 1   | 2   | 1  | 1   | 1     | 4    | 5              |
| Total         | 5  | 9  | 23  | 56  | 36  | 90  | 21  | 92  | 6  | 25  | 91    | 272  | 363            |
| Flowers       |    |    |     |     |     |     |     |     |    |     |       |      |                |
| Conario       | 23 | 33 | 200 | 446 | 253 | 614 | 202 | 463 | 52 | 150 | 755   | 1762 | 2497           |
| Total         |    |    |     |     |     |     |     |     |    |     |       |      |                |
| Flowers       | 23 | 33 | 200 | 446 | 253 | 614 | 202 | 463 | 52 | 150 | 755   | 1762 | 2497           |

| Fruits.      | 21 | 35 | 72 | 111 | 100 | 146 | 54 | 119 | 26 | 25 | 273 | 436 | 709 |
|--------------|----|----|----|-----|-----|-----|----|-----|----|----|-----|-----|-----|
| Apples       | 1  | 3  | 6  | 4   | 9   | 10  | 4  | 6   |    | 2  | 20  | 25  | 45  |
| Bananas      |    |    |    |     |     |     |    | 1   | 1  |    | 1   | 1   | 2   |
| Berries      |    |    |    |     |     |     |    |     |    |    |     | 2   | 2   |
| Blackberries |    |    |    | 1   |     | 1   |    |     |    |    |     | 2   | 2   |
| Cherries     |    |    | 1  | 5   | 5   | 6   | 2  | 4   |    |    | 8   | 15  | 23  |
| Grapes       | 1  | 4  | 3  | 8   | 5   | 5   | 6  | 10  | 4  | 1  | 19  | 28  | 47  |
| Lemon        |    |    | 1  | 1   |     |     |    |     |    |    | 1   | 1   | 2   |
| Orange       |    | 2  | 4  | 3   | 10  | 7   | 1  | 6   | 1  | 1  | 16  | 24  | 40  |
| Peach        | 1  |    | 2  | 5   |     | 4   |    |     |    |    | 3   | 9   | 12  |
| Pear         | 4  | 2  | 15 | 12  | 9   | 13  | 2  | 4   | 2  | 1  | 32  | 32  | 64  |
| Pineapple    |    |    | 1  |     | 1   | 1   | 1  |     |    |    | 3   | 1   | 4   |
| Plum         |    |    | 1  | 4   | 1   | 3   |    |     |    |    | 2   | 7   | 9   |
| Raspberries  |    | 1  |    |     |     |     |    |     |    |    |     | 1   | 1   |
| Strawberries |    |    |    | 1   |     |     |    |     |    |    |     | 1   | 1   |
| Watermelon   | 2  |    | 1  | 2   | 1   | 1   | 1  |     |    |    | 5   | 3   | 8   |



[illegible]









| 1900    | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 | 1908 | 1909 | 1910 | 1911 | 1912 | 1913 | 1914 | 1915 | 1916 | 1917 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Part of |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| of      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| the     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| year    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| ending  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| March   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1900    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1901    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1902    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1903    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1904    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1905    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1906    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1907    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1908    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1909    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1910    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1911    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1912    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1913    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1914    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1915    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1916    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1917    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1918    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1919    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1920    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1921    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1922    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1923    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1924    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1925    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1926    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1927    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1928    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1929    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1930    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1931    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1932    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1933    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1934    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1935    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1936    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1937    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1938    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1939    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1940    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1941    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1942    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1943    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1944    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1945    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1946    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1947    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1948    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1949    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1950    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1951    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1952    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1953    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1954    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1955    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1956    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1957    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1958    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1959    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1960    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1961    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1962    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1963    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1964    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1965    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1966    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1967    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1968    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1969    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1970    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |



| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|--------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| State/Normal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |





| House Furnishings   |    |     |     |     |     |      |     |      |     |     |     |      |       |
|---------------------|----|-----|-----|-----|-----|------|-----|------|-----|-----|-----|------|-------|
|                     | 1  | 2   | 3   | 4   | 5   | 6    | 7   | 8    | 9   | 10  | 11  | 12   | Total |
| Filter              |    |     | 2   | 2   | 2   | 4    |     |      |     |     |     |      | 10    |
| Furniture and house | 1  |     | 10  | 37  | 30  | 40   | 19  | 18   |     | 2   | 13  | 174  | 274   |
| Plate wall          | 1  |     |     |     |     |      |     |      |     |     |     |      | 1     |
| Race                |    |     | 1   |     |     |      |     |      |     |     |     |      | 1     |
| Hand table          | 1  |     |     |     |     |      |     |      |     |     |     |      | 1     |
| Shoe                |    |     |     |     |     |      |     |      |     |     |     |      | 1     |
| Shoe                |    |     | 2   | 2   | 2   |      |     |      |     |     |     |      | 6     |
| Table               | 27 | 47  | 177 | 303 | 310 | 478  | 204 | 470  | 12  | 138 | 817 | 1477 | 2714  |
| Two lamp            |    |     |     |     |     |      |     |      |     |     |     |      | 1     |
| Wardrobe            |    |     |     | 1   |     |      |     |      |     |     |     |      | 1     |
| Wardrobe            |    |     |     |     |     |      |     |      |     |     |     |      | 1     |
| Window box          |    |     | 1   |     |     |      |     |      |     |     |     |      | 1     |
| Total               | 30 | 172 | 438 | 863 | 883 | 1377 | 842 | 1473 | 124 | 134 | 817 | 1477 | 2714  |

| House Furnishings |   |   |    |    |    |     |    |    |   |    |    |    |       |
|-------------------|---|---|----|----|----|-----|----|----|---|----|----|----|-------|
|                   | 1 | 2 | 3  | 4  | 5  | 6   | 7  | 8  | 9 | 10 | 11 | 12 | Total |
| Light and         |   |   |    |    |    |     |    |    |   |    |    |    |       |
| Heating           |   |   |    |    |    |     |    |    |   |    |    |    |       |
| Chandelier        |   |   |    |    | 1  | 2   |    |    |   |    |    |    | 3     |
| Candle            | 1 |   | 10 | 10 | 5  | 10  | 10 | 7  | 2 |    |    |    | 37    |
| Candle stick      |   |   |    |    | 2  | 1   | 3  | 2  |   |    |    |    | 10    |
| Chandelier        |   |   |    |    |    |     | 1  | 2  |   |    |    |    | 3     |
| Electric light    | 1 |   | 3  | 10 | 11 | 20  | 11 | 10 | 2 | 10 |    |    | 58    |
| Pump              |   |   | 1  |    |    |     | 1  |    |   |    |    |    | 2     |
| Gas heater        |   |   |    | 1  |    |     |    |    |   |    |    |    | 1     |
| Gas Jet           |   |   |    |    |    |     | 2  | 2  |   |    |    |    | 4     |
| Lamp              | 2 |   | 4  | 6  | 10 | 10  | 7  | 10 | 1 |    |    |    | 40    |
| Light plug        |   |   |    |    |    |     |    |    |   |    |    | 1  | 1     |
| Light switch      |   |   |    |    |    |     |    |    |   |    |    | 1  | 1     |
| Radiator          |   |   |    |    |    |     |    |    |   |    |    | 1  | 1     |
| Stove             | 4 | 2 | 11 | 17 | 10 | 40  | 11 | 20 | 4 | 6  |    |    | 104   |
| Stove pipe        |   |   |    |    |    |     |    |    |   |    |    |    | 1     |
| Total             | 8 | 7 | 41 | 43 | 38 | 103 | 40 | 70 | 9 | 16 |    |    | 235   |

| House Furnishings |   |   |    |    |    |    |    |    |   |    |    |    |       |
|-------------------|---|---|----|----|----|----|----|----|---|----|----|----|-------|
|                   | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9 | 10 | 11 | 12 | Total |
| Table             |   |   |    |    |    |    |    |    |   |    |    |    |       |
| Chair             |   |   |    | 4  |    | 1  |    |    |   |    |    |    | 5     |
| Wardrobe          |   |   |    | 3  |    |    |    |    |   |    |    |    | 3     |
| Wardrobe          | 1 | 6 | 11 | 17 | 14 | 24 | 10 | 33 | 3 | 6  |    |    | 100   |
| Wardrobe          |   |   |    | 1  |    |    |    |    |   |    |    |    | 1     |
| Wardrobe          |   |   |    |    |    |    |    |    |   |    |    |    | 1     |
| Wardrobe          |   |   |    | 1  |    |    |    |    |   |    |    |    | 1     |
| Wardrobe          |   |   |    | 2  | 1  | 1  |    | 1  |   |    |    |    | 5     |
| Wardrobe          |   |   |    | 1  |    |    |    |    |   |    |    |    | 1     |
| Wardrobe          |   |   |    |    |    |    |    |    |   |    |    |    | 1     |
| Wardrobe          | 1 |   | 11 | 24 | 10 | 10 | 3  | 6  | 2 | 1  |    |    | 51    |
| Wardrobe          |   |   |    | 10 |    | 2  |    | 1  |   |    |    |    | 13    |
| Wardrobe          |   |   | 1  |    |    |    |    |    |   |    |    |    | 1     |
| Wardrobe          |   |   |    |    |    |    |    |    |   |    |    |    | 1     |
| Total             | 2 | 6 | 31 | 54 | 25 | 45 | 10 | 41 | 4 | 7  |    |    | 155   |

Wardrobe  
Wardrobe  
Wardrobe



[illegible]





| Material | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 338 | 339 | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 | 379 | 380 | 381 | 382 | 383 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 | 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 | 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 | 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 478 | 479 | 480 | 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 | 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 | 518 | 519 | 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 | 541 | 542 | 543 | 544 | 545 | 546 | 547 | 548 | 549 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 | 560 | 561 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 | 578 | 579 | 580 | 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 590 | 591 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 | 601 | 602 | 603 | 604 | 605 | 606 | 607 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 618 | 619 | 620 | 621 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 | 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 | 658 | 659 | 660 | 661 | 662 | 663 | 664 | 665 | 666 | 667 | 668 | 669 | 670 | 671 | 672 | 673 | 674 | 675 | 676 | 677 | 678 | 679 | 680 | 681 | 682 | 683 | 684 | 685 | 686 | 687 | 688 | 689 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 698 | 699 | 700 | 701 | 702 | 703 | 704 | 705 | 706 | 707 | 708 | 709 | 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 | 718 | 719 | 720 | 721 | 722 | 723 | 724 | 725 | 726 | 727 | 728 | 729 | 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 | 738 | 739 | 740 | 741 | 742 | 743 | 744 | 745 | 746 | 747 | 748 | 749 | 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 | 758 | 759 | 760 | 761 | 762 | 763 | 764 | 765 | 766 | 767 | 768 | 769 | 770 | 771 | 772 | 773 | 774 | 775 | 776 | 777 | 778 | 779 | 780 | 781 | 782 | 783 | 784 | 785 | 786 | 787 | 788 | 789 | 790 | 791 | 792 | 793 | 794 | 795 | 796 | 797 | 798 | 799 | 800 | 801 | 802 | 803 | 804 | 805 | 806 | 807 | 808 | 809 | 810 | 811 | 812 | 813 | 814 | 815 | 816 | 817 | 818 | 819 | 820 | 821 | 822 | 823 | 824 | 825 | 826 | 827 | 828 | 829 | 830 | 831 | 832 | 833 | 834 | 835 | 836 | 837 | 838 | 839 | 840 | 841 | 842 | 843 | 844 | 845 | 846 | 847 | 848 | 849 | 850 | 851 | 852 | 853 | 854 | 855 | 856 | 857 | 858 | 859 | 860 | 861 | 862 | 863 | 864 | 865 | 866 | 867 | 868 | 869 | 870 | 871 | 872 | 873 | 874 | 875 | 876 | 877 | 878 | 879 | 880 | 881 | 882 | 883 | 884 | 885 | 886 | 887 | 888 | 889 | 890 | 891 | 892 | 893 | 894 | 895 | 896 | 897 | 898 | 899 | 900 | 901 | 902 | 903 | 904 | 905 | 906 | 907 | 908 | 909 | 910 | 911 | 912 | 913 | 914 | 915 | 916 | 917 | 918 | 919 | 920 | 921 | 922 | 923 | 924 | 925 | 926 | 927 | 928 | 929 | 930 | 931 | 932 | 933 | 934 | 935 | 936 | 937 | 938 | 939 | 940 | 941 | 942 | 943 | 944 | 945 | 946 | 947 | 948 | 949 | 950 | 951 | 952 | 953 | 954 | 955 | 956 | 957 | 958 | 959 | 960 | 961 | 962 | 963 | 964 | 965 | 966 | 967 | 968 | 969 | 970 | 971 | 972 | 973 | 974 | 975 | 976 | 977 | 978 | 979 | 980 | 981 | 982 | 983 | 984 | 985 | 986 | 987 | 988 | 989 | 990 | 991 | 992 | 993 | 994 | 995 | 996 | 997 | 998 | 999 | 1000 | 1001 | 1002 | 1003 | 1004 | 1005 | 1006 | 1007 | 1008 | 1009 | 1010 | 1011 | 1012 | 1013 | 1014 | 1015 | 1016 | 1017 | 1018 | 1019 | 1020 | 1021 | 1022 | 1023 | 1024 | 1025 | 1026 | 1027 | 1028 | 1029 | 1030 | 1031 | 1032 | 1033 | 1034 | 1035 | 1036 | 1037 | 1038 | 1039 | 1040 | 1041 | 1042 | 1043 | 1044 | 1045 | 1046 | 1047 | 1048 | 1049 | 1050 | 1051 | 1052 | 1053 | 1054 | 1055 | 1056 | 1057 | 1058 | 1059 | 1060 | 1061 | 1062 | 1063 | 1064 | 1065 | 1066 | 1067 | 1068 | 1069 | 1070 | 1071 | 1072 | 1073 | 1074 | 1075 | 1076 | 1077 | 1078 | 1079 | 1080 | 1081 | 1082 | 1083 | 1084 | 1085 | 1086 | 1087 | 1088 | 1089 | 1090 | 1091 | 1092 | 1093 | 1094 | 1095 | 1096 | 1097 | 1098 | 1099 | 1100 | 1101 | 1102 | 1103 | 1104 | 1105 | 1106 | 1107 | 1108 | 1109 | 1110 | 1111 | 1112 | 1113 | 1114 | 1115 | 1116 | 1117 | 1118 | 1119 | 1120 | 1121 | 1122 | 1123 | 1124 | 1125 | 1126 | 1127 | 1128 | 1129 | 1130 | 1131 | 1132 | 1133 | 1134 | 1135 | 1136 | 1137 | 1138 | 1139 | 1140 | 1141 | 1142 | 1143 | 1144 | 1145 | 1146 | 1147 | 1148 | 1149 | 1150 | 1151 | 1152 | 1153 | 1154 | 1155 | 1156 | 1157 | 1158 | 1159 | 1160 | 1161 | 1162 | 1163 | 1164 | 1165 | 1166 | 1167 | 1168 | 1169 | 1170 | 1171 | 1172 | 1173 | 1174 | 1175 | 1176 | 1177 | 1178 | 1179 | 1180 | 1181 | 1182 | 1183 | 1184 | 1185 | 1186 | 1187 | 1188 | 1189 | 1190 | 1191 | 1192 | 1193 | 1194 | 1195 | 1196 | 1197 | 1198 | 1199 | 1200 | 1201 | 1202 | 1203 | 1204 | 1205 | 1206 | 1207 | 1208 | 1209 | 1210 | 1211 | 1212 | 1213 | 1214 | 1215 | 1216 | 1217 | 1218 | 1219 | 1220 | 1221 | 1222 | 1223 | 1224 | 1225 | 1226 | 1227 | 1228 | 1229 | 1230 | 1231 | 1232 | 1233 | 1234 | 1235 | 1236 | 1237 | 1238 | 1239 | 1240 | 1241 | 1242 | 1243 | 1244 | 1245 | 1246 | 1247 | 1248 | 1249 | 1250 | 1251 | 1252 | 1253 | 1254 | 1255 | 1256 | 1257 | 1258 | 1259 | 1260 | 1261 | 1262 | 1263 | 1264 | 1265 | 1266 | 1267 | 1268 | 1269 | 1270 | 1271 | 1272 | 1273 | 1274 | 1275 | 1276 | 1277 | 1278 | 1279 | 1280 | 1281 | 1282 | 1283 | 1284 | 1285 | 1286 | 1287 | 1288 | 1289 | 1290 | 1291 | 1292 | 1293 | 1294 | 1295 | 1296 | 1297 | 1298 | 1299 | 1300 | 1301 | 1302 | 1303 | 1304 | 1305 | 1306 | 1307 | 1308 | 1309 | 1310 | 1311 | 1312 | 1313 | 1314 | 1315 | 1316 | 1317 | 1318 | 1319 | 1320 | 1321 | 1322 | 1323 | 1324 | 1325 | 1326 | 1327 | 1328 | 1329 | 1330 | 1331 | 1332 | 1333 | 1334 | 1335 | 1336 | 1337 | 1338 | 1339 | 1340 | 1341 | 1342 | 1343 | 1344 | 1345 | 1346 | 1347 | 1348 | 1349 | 1350 | 1351 | 1352 | 1353 | 1354 | 1355 | 1356 | 1357 | 1358 | 1359 | 1360 | 1361 | 1362 | 1363 | 1364 | 1365 | 1366 | 1367 | 1368 | 1369 | 1370 | 1371 | 1372 | 1373 | 1374 | 1375 | 1376 | 1377 | 1378 | 1379 | 1380 | 1381 | 1382 | 1383 | 1384 | 1385 | 1386 | 1387 | 1388 | 1389 | 1390 | 1391 | 1392 | 1393 | 1394 | 1395 | 1396 | 1397 | 1398 | 1399 | 1400 | 1401 | 1402 | 1403 | 1404 | 1405 | 1406 | 1407 | 1408 | 1409 | 1410 | 1411 | 1412 | 1413 | 1414 | 1415 | 1416 | 1417 | 1418 | 1419 | 1420 | 1421 | 1422 | 1423 | 1424 | 1425 | 1426 | 1427 | 1428 | 1429 | 1430 | 1431 | 1432 | 1433 | 1434 | 1435 | 1436 | 1437 | 1438 | 1439 | 1440 | 1441 | 1442 | 1443 | 1444 | 1445 | 1446 | 1447 | 1448 | 1449 | 1450 | 1451 | 1452 | 1453 | 1454 | 1455 | 1456 | 1457 | 1458 | 1459 | 1460 | 1461 | 1462 | 1463 | 1464 | 1465 | 1466 | 1467 | 1468 | 1469 | 1470 | 1471 | 1472 | 1473 | 1474 | 1475 | 1476 | 1477 | 1478 | 1479 | 1480 | 1481 | 1482 | 1483 | 1484 | 1485 | 1486 | 1487 | 1488 | 1489 | 1490 | 1491 | 1492 | 1493 | 1494 | 1495 |
|----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--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|-------------------|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|----|



| Classification | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 338 | 339 | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 | 379 | 380 | 381 | 382 | 383 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 | 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 | 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 | 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 478 | 479 | 480 | 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 | 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 | 518 | 519 | 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 | 541 | 542 | 543 | 544 | 545 | 546 | 547 | 548 | 549 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 | 560 | 561 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 | 578 | 579 | 580 | 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 590 | 591 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 | 601 | 602 | 603 | 604 | 605 | 606 | 607 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 618 | 619 | 620 | 621 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 | 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 | 658 | 659 | 660 | 661 | 662 | 663 | 664 | 665 | 666 | 667 | 668 | 669 | 670 | 671 | 672 | 673 | 674 | 675 | 676 | 677 | 678 | 679 | 680 | 681 | 682 | 683 | 684 | 685 | 686 | 687 | 688 | 689 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 698 | 699 | 700 | 701 | 702 | 703 | 704 | 705 | 706 | 707 | 708 | 709 | 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 | 718 | 719 | 720 | 721 | 722 | 723 | 724 | 725 | 726 | 727 | 728 | 729 | 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 | 738 | 739 | 740 | 741 | 742 | 743 | 744 | 745 | 746 | 747 | 748 | 749 | 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 | 758 | 759 | 760 | 761 | 762 | 763 | 764 | 765 | 766 | 767 | 768 | 769 | 770 | 771 | 772 | 773 | 774 | 775 | 776 | 777 | 778 | 779 | 780 | 781 | 782 | 783 | 784 | 785 | 786 | 787 | 788 | 789 | 790 | 791 | 792 | 793 | 794 | 795 | 796 | 797 | 798 | 799 | 800 | 801 | 802 | 803 | 804 | 805 | 806 | 807 | 808 | 809 | 810 | 811 | 812 | 813 | 814 | 815 | 816 | 817 | 818 | 819 | 820 | 821 | 822 | 823 | 824 | 825 | 826 | 827 | 828 | 829 | 830 | 831 | 832 | 833 | 834 | 835 | 836 | 837 | 838 | 839 | 840 | 841 | 842 | 843 | 844 | 845 | 846 | 847 | 848 | 849 | 850 | 851 | 852 | 853 | 854 | 855 | 856 | 857 | 858 | 859 | 860 | 861 | 862 | 863 | 864 | 865 | 866 | 867 | 868 | 869 | 870 | 871 | 872 | 873 | 874 | 875 | 876 | 877 | 878 | 879 | 880 | 881 | 882 | 883 | 884 | 885 | 886 | 887 | 888 | 889 | 890 | 891 | 892 | 893 | 894 | 895 | 896 | 897 | 898 | 899 | 900 | 901 | 902 | 903 | 904 | 905 | 906 | 907 | 908 | 909 | 910 | 911 | 912 | 913 | 914 | 915 | 916 | 917 | 918 | 919 | 920 | 921 | 922 | 923 | 924 | 925 | 926 | 927 | 928 | 929 | 930 | 931 | 932 | 933 | 934 | 935 | 936 | 937 | 938 | 939 | 940 | 941 | 942 | 943 | 944 | 945 | 946 | 947 | 948 | 949 | 950 | 951 | 952 | 953 | 954 | 955 | 956 | 957 | 958 | 959 | 960 | 961 | 962 | 963 | 964 | 965 | 966 | 967 | 968 | 969 | 970 | 971 | 972 | 973 | 974 | 975 | 976 | 977 | 978 | 979 | 980 | 981 | 982 | 983 | 984 | 985 | 986 | 987 | 988 | 989 | 990 | 991 | 992 | 993 | 994 | 995 | 996 | 997 | 998 | 999 | 1000 |
|----------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--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| Shovel         | 1 |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     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    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |





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| 2007-2008 |  | 2008-2009 |  | 2009-2010 |  | 2010-2011 |  | 2011-2012 |  | 2012-2013 |  | 2013-2014 |  | 2014-2015 |  | 2015-2016 |  | 2016-2017 |  | 2017-2018 |  | 2018-2019 |  | 2019-2020 |  | 2020-2021 |  | 2021-2022 |  | 2022-2023 |  | 2023-2024 |  | 2024-2025 |  | 2025-2026 |  | 2026-2027 |  | 2027-2028 |  | 2028-2029 |  | 2029-2030 |  | 2030-2031 |  | 2031-2032 |  | 2032-2033 |  | 2033-2034 |  | 2034-2035 |  | 2035-2036 |  | 2036-2037 |  | 2037-2038 |  | 2038-2039 |  | 2039-2040 |  | 2040-2041 |  | 2041-2042 |  | 2042-2043 |  | 2043-2044 |  | 2044-2045 |  | 2045-2046 |  | 2046-2047 |  | 2047-2048 |  | 2048-2049 |  | 2049-2050 |  | 2050-2051 |  | 2051-2052 |  | 2052-2053 |  | 2053-2054 |  | 2054-2055 |  | 2055-2056 |  | 2056-2057 |  | 2057-2058 |  | 2058-2059 |  | 2059-2060 |  | 2060-2061 |  | 2061-2062 |  | 2062-2063 |  | 2063-2064 |  | 2064-2065 |  | 2065-2066 |  | 2066-2067 |  | 2067-2068 |  | 2068-2069 |  | 2069-2070 |  | 2070-2071 |  | 2071-2072 |  | 2072-2073 |  | 2073-2074 |  | 2074-2075 |  | 2075-2076 |  | 2076-2077 |  | 2077-2078 |  | 2078-2079 |  | 2079-2080 |  | 2080-2081 |  | 2081-2082 |  | 2082-2083 |  | 2083-2084 |  | 2084-2085 |  | 2085-2086 |  | 2086-2087 |  | 2087-2088 |  | 2088-2089 |  | 2089-2090 |  | 2090-2091 |  | 2091-2092 |  | 2092-2093 |  | 2093-2094 |  | 2094-2095 |  | 2095-2096 |  | 2096-2097 |  | 2097-2098 |  | 2098-2099 |  | 2099-2100 |  | 2100-2101 |  | 2101-2102 |  | 2102-2103 |  | 2103-2104 |  | 2104-2105 |  | 2105-2106 |  | 2106-2107 |  | 2107-2108 |  | 2108-2109 |  | 2109-2110 |  | 2110-2111 |  | 2111-2112 |  | 2112-2113 |  | 2113-2114 |  | 2114-2115 |  | 2115-2116 |  | 2116-2117 |  | 2117-2118 |  | 2118-2119 |  | 2119-2120 |  | 2120-2121 |  | 2121-2122 |  | 2122-2123 |  | 2123-2124 |  | 2124-2125 |  | 2125-2126 |  | 2126-2127 |  | 2127-2128 |  | 2128-2129 |  | 2129-2130 |  | 2130-2131 |  | 2131-2132 |  | 2132-2133 |  | 2133-2134 |  | 2134-2135 |  | 2135-2136 |  | 2136-2137 |  | 2137-2138 |  | 2138-2139 |  | 2139-2140 |  | 2140-2141 |  | 2141-2142 |  | 2142-2143 |  | 2143-2144 |  | 2144-2145 |  | 2145-2146 |  | 2146-2147 |  | 2147-2148 |  | 2148-2149 |  | 2149-2150 |  | 2150-2151 |  | 2151-2152 |  | 2152-2153 |  | 2153-2154 |  | 2154-2155 |  | 2155-2156 |  | 2156-2157 |  | 2157-2158 |  | 2158-2159 |  | 2159-2160 |  | 2160-2161 |  | 2161-2162 |  | 2162-2163 |  | 2163-2164 |  | 2164-2165 |  | 2165-2166 |  | 2166-2167 |  | 2167-2168 |  | 2168-2169 |  | 2169-2170 |  | 2170-2171 |  | 2171-2172 |  | 2172-2173 |  | 2173-2174 |  | 2174-2175 |  | 2175-2176 |  | 2176-2177 |  | 2177-2178 |  | 2178-2179 |  | 2179-2180 |  | 2180-2181 |  | 2181-2182 |  | 2182-2183 |  | 2183-2184 |  | 2184-2185 |  | 2185-2186 |  | 2186-2187 |  | 2187-2188 |  | 2188-2189 |  | 2189-2190 |  | 2190-2191 |  | 2191-2192 |  | 2192-2193 |  | 2193-2194 |  | 2194-2195 |  | 2195-2196 |  | 2196-2197 |  | 2197-2198 |  | 2198-2199 |  | 2199-2200 |  | 2200-2201 |  | 2201-2202 |  | 2202-2203 |  | 2203-2204 |  | 2204-2205 |  | 2205-2206 |  | 2206-2207 |  | 2207-2208 |  | 2208-2209 |  | 2209-2210 |  | 2210-2211 |  | 2211-2212 |  | 2212-2213 |  | 2213-2214 |  | 2214-2215 |  | 2215-2216 |  | 2216-2217 |  | 2217-2218 |  | 2218-2219 |  | 2219-2220 |  | 2220-2221 |  | 2221-2222 |  | 2222-2223 |  | 2223-2224 |  | 2224-2225 |  | 2225-2226 |  | 2226-2227 |  | 2227-2228 |  | 2228-2229 |  | 2229-2230 |  | 2230-2231 |  | 2231-2232 |  | 2232-2233 |  | 2233-2234 |  | 2234-2235 |  | 2235-2236 |  | 2236-2237 |  | 2237-2238 |  | 2238-2239 |  | 2239-2240 |  | 2240-2241 |  | 2241-2242 |  | 2242-2243 |  | 2243-2244 |  | 2244-2245 |  | 2245-2246 |  | 2246-2247 |  | 2247-2248 |  | 2248-2249 |  | 2249-2250 |  | 2250-2251 |  | 2251-2252 |  | 2252-2253 |  | 2253-2254 |  | 2254-2255 |  | 2255-2256 |  | 2256-2257 |  | 2257-2258 |  | 2258-2259 |  | 2259-2260 |  | 2260-2261 |  | 2261-2262 |  | 2262-2263 |  | 2263-2264 |  | 2264-2265 |  | 2265-2266 |  | 2266-2267 |  | 2267-2268 |  | 2268-2269 |  | 2269-2270 |  | 2270-2271 |  | 2271-2272 |  | 2272-2273 |  | 2273-2274 |  | 2274-2275 |  | 2275-2276 |  | 2276-2277 |  | 2277-2278 |  | 2278-2279 |  | 2279-2280 |  | 2280-2281 |  | 2281-2282 |  | 2282-2283 |  | 2283-2284 |  | 2284-2285 |  | 2285-2286 |  | 2286-2287 |  | 2287-2288 |  | 2288-2289 |  | 2289-2290 |  | 2290-2291 |  | 2291-2292 |  | 2292-2293 |  | 2293-2294 |  | 2294-2295 |  | 2295-2296 |  | 2296-2297 |  | 2297-2298 |  | 2298-2299 |  | 2299-2300 |  | 2300-2301 |  | 2301-2302 |  | 2302-2303 |  | 2303-2304 |  | 2304-2305 |  | 2305-2306 |  | 2306-2307 |  | 2307-2308 |  | 2308-2309 |  | 2309-2310 |  | 2310-2311 |  | 2311-2312 |  | 2312-2313 |  | 2313-2314 |  | 2314-2315 |  | 2315-2316 |  | 2316-2317 |  | 2317-2318 |  | 2318-2319 |  | 2319-2320 |  | 2320-2321 |  | 2321-2322 |  | 2322-2323 |  | 2323-2324 |  | 2324-2325 |  | 2325-2326 |  | 2326-2327 |  | 2327-2328 |  | 2328-2329 |  | 2329-2330 |  | 2330-2331 |  | 2331-2332 |  | 2332-2333 |  | 2333-2334 |  | 2334-2335 |  | 2335-2336 |  | 2336-2337 |  | 2337-2338 |  | 2338-2339 |  | 2339-2340 |  | 2340-2341 |  | 2341-2342 |  | 2342-2343 |  | 2343-2344 |  | 2344-2345 |  | 2345-2346 |  | 2346-2347 |  | 2347-2348 |  | 2348-2349 |  | 2349-2350 |  | 2350-2351 |  | 2351-2352 |  | 2352-2353 |  | 2353-2354 |  | 2354-2355 |  | 2355-2356 |  | 2356-2357 |  | 2357-2358 |  | 2358-2359 |  | 2359-2360 |  | 2360-2361 |  | 2361-2362 |  | 2362-2363 |  | 2363-2364 |  | 2364-2365 |  | 2365-2366 |  | 2366-2367 |  | 2367-2368 |  | 2368-2369 |  | 2369-2370 |  | 2370-2371 |  | 2371-2372 |  | 2372-2373 |  | 2373-2374 |  | 2374-2375 |  | 2375-2376 |  | 2376-2377 |  | 2377-2378 |  | 2378-2379 |  | 2379-2380 |  | 2380-2381 |  | 2381-2382 |  | 2382-2383 |  | 2383-2384 |  | 2384-2385 |  | 2385-2386 |  | 2386-2387 |  | 2387-2388 |  | 2388-2389 |  | 2389-2390 |  | 2390-2391 |  | 2391-2392 |  | 2392-2393 |  | 2393-2394 |  | 2394-2395 |  | 2395-2396 |  | 2396-2397 |  | 2397-2398 |  | 2398-2399 |  | 2399-2400 |  | 2400-2401 |  | 2401-2402 |  | 2402-2403 |  | 2403-2404 |  | 2404-2405 |  | 2405-2406 |  | 2406-2407 |  | 2407-2408 |  | 2408-2409 |  | 2409-2410 |  | 2410-2411 |  | 2411-2412 |  | 2412-2413 |  | 2413-2414 |  | 2414-2415 |  | 2415-2416 |  | 2416-2417 |  | 2417-2418 |  | 2418-2419 |  | 2419-2420 |  | 2420-2421 |  | 2421-2422 |  | 2422-2423 |  | 2423-2424 |  | 2424-2425 |  | 2425-2426 |  | 2426-2427 |  | 2427-2428 |  | 2428-2429 |  | 2429-2430 |  | 2430-2431 |  | 2431-2432 |  | 2432-2433 |  | 2433-2434 |  | 2434-2435 |  | 2435-2436 |  | 2436-2437 |  | 2437-2438 |  | 2438-2439 |  | 2439-2440 |  | 2440-2441 |  | 2441-2442 |  | 2442-2443 |  | 2443-2444 |  | 2444-2445 |  | 2445-2446 |  | 2446-2447 |  | 2447-2448 |  | 2448-2449 |  | 2449-2450 |  | 2450-2451 |  | 2451-2452 |  | 2452-2453 |  | 2453-2454 |  | 2454-2455 |  | 2455-2456 |  | 2456-2457 |  | 2457-2458 |  | 2458-2459 |  | 2459-2460 |  | 2460-2461 |  | 2461-2462 |  | 2462-2463 |  | 2463-2464 |  | 2464-2465 |  | 2465-2466 |  | 2466-2467 |  | 2467-2468 |  | 2468-2469 |  | 2469-2470 |  | 2470-2471 |  | 2471-2472 |  | 2472-2473 |  | 2473-2474 |  | 2474-2475 |  | 2475-2476 |  | 2476-2477 |  | 2477-2478 |  | 2478-2479 |  | 2479-2480 |  | 2480-2481 |  | 2481-2482 |  | 2482-2483 |  | 2483-2484 |  | 2484-2485 |  | 2485-2486 |  | 2486-2487 |  | 2487-2488 |  | 2488-2489 |  | 2489-2490 |  | 2490-2491 |  | 2491-2492 |  | 2492-2493 |  | 2493-2494 |  | 2494-2495 |  | 2495-2496 |  | 2496-2497 |  | 2497-2498 |  | 2498-2499 |  | 2499-2500 |  | 2500-2501 |  | 2501-2502 |  | 2502-2503 |  | 2503-2504 |  | 2504-2505 |  | 2505-2506 |  | 2506-2507 |  | 2507-2508 |  | 2508-2509 |  | 2509-2510 |  | 2510-2511 |  | 2511-2512 |  | 2512-2513 |  | 2513-2514 |  | 2514-2515 |  | 2515-2516 |  | 2516-2517 |  | 2517-2518 |  | 2518-2519 |  | 2519-2520 |  | 2520-2521 |  | 2521-2522 |  | 2522-2523 |  | 2523-2524 |  | 2524-2525 |  | 2525-2526 |  | 2526-2527 |  | 2527-2528 |  | 2528-2529 |  | 2529-2530 |  | 2530-2531 |  | 2531-2532 |  | 2532-2533 |  | 2533-2534 |  | 2534-2535 |  | 2535-2536 |  | 2536-2537 |  | 2537-2538 |  | 2538-2539 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2605-2606 |  | 2606-2607 |  | 2607-2608 |  | 2608-2609 |  | 2609-2610 |  | 2610-2611 |  | 2611-2612 |  | 2612-2613 |  | 2613-2614 |  | 2614-2615 |  | 2615-2616 |  | 2616-2617 |  | 2617-2618 |  | 2618-2619 |  | 2619-2620 |  | 2620-2621 |  | 2621-2622 |  | 2622-2623 |  | 2623-2624 |  | 2624-2625 |  | 2625-2626 |  | 2626-2627 |  | 2627-2628 |  | 2628-2629 |  | 2629-2630 |  | 2630-2631 |  | 2631-2632 |  | 2632-2633 |  | 2633-2634 |  | 2634-2635 |  | 2635-2636 |  | 2636-2637 |  | 2637-2638 |  | 2638-2639 |  | 2639-2640 |  | 2640-2641 |  | 2641-2642 |  | 2642-2643 |  | 2643-2644 |  | 2644-2645 |  | 2645-2646 |  | 2646-2647 |  | 2647-2648 |  | 2648-2649 |  | 2649-2650 |  | 2650-2651 |  | 2651-2652 |  | 2652-2653 |  | 2653-2654 |  | 2654-2655 |  | 2655-2656 |  | 2656-2657 |  | 2657-2658 |  | 2658-2659 |  | 2659-2660 |  | 2660-2661 |  | 2661-2662 |  | 2662-2663 |  | 2663-2664 |  | 2664-2665 |  | 2665-2666 |  | 2666-2667 |  | 2667-2668 |  | 2668-2669 |  | 2669-2670 |  | 2670-2671 |  | 2671-2672 |  | 2672-2673 |  | 2673-2674 |  | 2674-2675 |  | 2675-2676 |  | 2676-2677 |  | 2677-2678 |  | 2678-2679 |  | 2679-2680 |  | 2680-2681 |  | 2681-2682 |  | 2682-2683 |  | 2683-2684 |  | 2684-2685 |  | 2685-2686 |  | 2686-2687 |  | 2687-2688 |  | 2688-2689 |  | 2689-2690 |  | 2690-2691 |  | 2691-2692 |  | 2692-2693 |  | 2693-2694 |  | 2694-2695 |  | 2695-2696 |  | 2696-2697 |  | 2697-2698 |  | 2698-2699 |  | 2699-2700 |  | 2700-2701 |  | 2701-2702 |  | 2702-2703 |  | 2703-2704 |  | 2704-2705 |  | 2705-2706 |  | 2706-2707 |  | 2707-2708 |  | 2708-2709 |  | 2709-2710 |  | 2710-2711 |  | 2711-2712 |  | 2712-2713 |  | 2713-2714 |  | 2714-2715 |  | 2715-2716 |  | 2716-2717 |  | 2717-2718 |  | 2718-2719 |  | 2719-2720 |  | 2720-2721 |  | 2721-2722 |  | 2722-2723 |  | 2723-2724 |  | 2724-2725 |  | 2725-2726 |  | 2726-2727 |  | 2727-2728 |  | 2728-2729 |  | 2729-2730 |  | 2730-2731 |  | 2731-2732 |  | 2732-2733 |  | 2733-2734 |  | 2734-2735 |  |
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| Design            | 27 | 7  | 167 | 118 | 200 | 238 | 224 | 218 | 14  | 23  | 238   | 232 | 1477           |
| Letters           | 24 | 42 | 48  | 38  | 18  | 44  | 20  | 38  | 8   | 8   | 218   | 227 | 352            |
| and Figures       | 42 | 38 | 177 | 219 | 248 | 278 | 240 | 258 | 101 | 102 | 242   | 248 | 1487           |









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BIOGRAPHY

Stella Ames McDerty was born in Urbana, Illinois, in 1878. She was educated in the Public Schools of Urbana, Urbana and in Major's Female College, New York City, entering Teacher College in 1898. Graduating in 1902, she taught one year in the Girls' High School, then associated with the College as a preparatory department. She entered Teacher's Training School in Indianapolis, to prepare for professional work in the Kindergarten-Primary Field. In 1904 she received an assignment to teach Kindergarten and conduct a Primary class in Evansville, Ind. After six years in Evansville she returned to Indianapolis as supervisor of the Free Kindergartens and instructor in the Training School. From 1908 to 1914 she was Supervisor of Kindergartens in the Public Schools of Trenton, New Jersey. In 1915 - 16 she took a year's leave of absence which she spent in residence at Teachers College, Columbia University, where she began graduate work in 1917 obtaining her A.M. degree in 1918. She was appointed instructor in Education in Teacher College in 1918, Assistant Professor in 1919, and Associate Professor in 1921. She began her studies at Johns Hopkins University in 1914, spent the year 1920-21 in residence, and completed her class work in 1922, devoting the final year solely to her dissertation.





















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NAME AND ADDRESS

Jan 22, 1924 Sent to U. Md. College, Pk (L. Bates) Not signed



